

# INTERNATIONAL COMPUTER GAMES ASSOCIATION



**Vol. 31  
No. 4  
December 2008  
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ISSN 1389-6911

**Contributions:**

N. Sturtevant:  
An Analysis of UCT in Multi-Player Games.

S. Droste and J. Fürnkranz:  
Learning the Piece Values for Three Chess Variants.

**Note:**

M. Winands:  
6x6 LOA is Solved.

**Reports on:**

The 16<sup>th</sup> Computer-Games Championship (part 2).  
The 2008 Computational Intelligence Forum and  
the 9x9 World Computer-Go Championship.  
The 2<sup>nd</sup> Stratego Computer World Championship.

*Published by  
Tilburg centre for  
Creative Computing (TiCC)  
Tilburg University  
Tilburg, The Netherlands*



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## MANY VARIANTS OF CHESS

The advances in computer-chess research and in particular the progress in playing strength of chess programs have led to broadening the scope of this Journal. The change of attention was embodied in a change of name: from *ICCA Journal* to *ICGA Journal* (the Journal of the International Computer Games Association). Still even under the new name, chess is the preferred testbed of our research efforts. Many techniques are now applied in other domains; some failed and some were successful. Notoriously is the failure of the search-and-evaluate paradigm in the domain of Go. Here, new techniques such as MCTS (Monte-Carlo Tree Search) and UCT (Upper Confidence bound applied to Trees) were found to work well.

In this issue we would like to stress that other computer-chess techniques turned out to result in new knowledge on chess-related games and in popularizing these games. Of course, for each such a game the results might be expected by the chess-related application domain. Yet, the proof is in the results and this issue reports on successful applications of the learning techniques ( $TD(\lambda)$  and  $TDleaf(\lambda)$ ) and the proof-number search variant ( $PN^2$ ). The learning techniques are applied to three variants of Chess: Suicide Chess (also known as Giveaway Chess), Crazyhouse Chess (derived from the four-player Bughouse Chess), and Atomic Chess (capturing a piece leads to an explosion).

The essence of this research is (1) to learn the values of the pieces, and (2) to learn the values of the squares in the piece-square tables. So, the research in itself is not new, but the application is. Therefore, the resultant knowledge is new, too. Many references are given by the authors (Sacha Droste and Johannes Fürnkranz) to the well-known researchers in this domain, starting with Samuel (1959). The games are explained extensively and the investigations read as an unputdownable essay. Despite their multitude of research findings the authors admit that after forty years of intensive research they still concur with Samuel's (1959) statement, repeated in his 1967 article: "... getting the program to generate its own parameters remains as far in the future as it seemed to be in 1959." Maybe strongly solving a game provides some clues to the composition of an evaluation function. However, this may already be too bold a statement which might be only applied to chess-related games. The first step to be made here is the transition from weakly solving to strongly solving.

At this moment we consider weakly solving a game as a performance in itself. The most prestigious example is of course solving Checkers as performed and reported by Schaeffer *et al.* (2007). For some games weakly

# THE 2008 COMPUTATIONAL INTELLIGENCE FORUM AND THE WORLD 9X9 COMPUTER-GO CHAMPIONSHIP IN TAIWAN

26-27 September, 2008  
Tainan, Taiwan

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Tainan, Taiwan

The 2008 Computational Intelligence Forum and the World 9×9 Computer Go Championship was held in Taiwan. This activity was partitioned into two parts, viz. the Computational Intelligence Forum and the World 9×9 Computer Go Championship. Professor Hideyuki Takagi and Dr. Olivier Teytaud were invited to make a keynote speech and an invited talk, respectively, in the 2008 Computational Intelligence Forum. MoGo won first place in the 2008 World 9×9 Computer Go Championship with no loss. The results of the invited games revealed that MoGo might reach about 2Dan-3Dan based on the amateur Taiwanese scale. We hope that Computer Go soon will perform on equal footing in their world as computer chess is doing in the chess community and Chinese chess is expected to do in the near future.

## 1. INTRODUCTION

For many years Computer-Go programs have been developed now. Owing to the rapid and vital advancement in Artificial Intelligence techniques, some scholars and experts have successfully developed new ideas in Computer-Go programs. In order to promote and further develop the Computer-Go programs, and to advocate the research, development, and applications of Computer Go, the 2008 Computational Intelligence Forum and the World 9×9 Computer Go Championship, were organized by the Chang Jung Christian University (CJCU), the National University of Tainan (NUTN), and the Taiwanese Association for Artificial Intelligence (TAAI). The venue was held in Taiwan in September 2008.

In the 2008 Computational Intelligence Forum, we invited Professor Hideyuki Takagi from Kyushu University of Japan and Dr. Olivier Teytaud from Inria of France to make a keynote speech and an invited talk, respectively, at NUTN on September 26, 2008. We also invited twelve researchers of related domains to give talks on their specific research for this forum. Besides, many professors and students who are interested in games and game research also joined the forum. We have constructed a website (<http://go.nutn.edu.tw/>) for the 2008 Computational Intelligence Forum and the World 9×9 Computer Go Championship at NUTN in Taiwan. Professor Hideyuki Takagi's keynote was titled *Interactive Evolutionary Computation*. Dr. Olivier Teytaud gave an invited talk about the *Monte-Carlo Tree Search for the Game of Go: Some Recent Advances in High-Dimensional Planning*. Additionally, two panel discussions were also held. The chairs and panelists included Professors Ce-Kuen Shieh, Wen-Yang Lin, Gwo-Jen Hwang, Tzung-Pei Hong, Yo-Ping Huang, Pau-Choo Chung, Shun-Shii Lin, Shun-Chin Hsu, Shi-Jim Yen, I-Chen Wu, Kuo-Yuan Kao, and Tsan-Sheng Hsu.

The World 9×9 Computer-Go Championship was partitioned into two sections: (1) *Section A* was a computer program competition held at CJCU; (2) *Section B* contained (1) the invited games, (2) a kid-against-kid competition, and (3) teaching games held at NUTN. In section A, ten Computer-Go programs from four countries participated in the tournament. MoGo won a gold medal with no loss. In section B, (1) the invited games were “Nine Taiwanese Go players versus the computer program MoGo” competition and (2) the top-six winners of kids were invited to join the teaching games. That is, they simultaneously played their 19×19 games with Mr. Jun-Xun Zhou, a 9D professional. At the same time, Mr. Zhou also played a 19×19 game with seven handicap stones against MoGo. The remainder of this report is as follows. Section 2 describes the game results in Taiwan. Finally, we draw our conclusion in Section 3.

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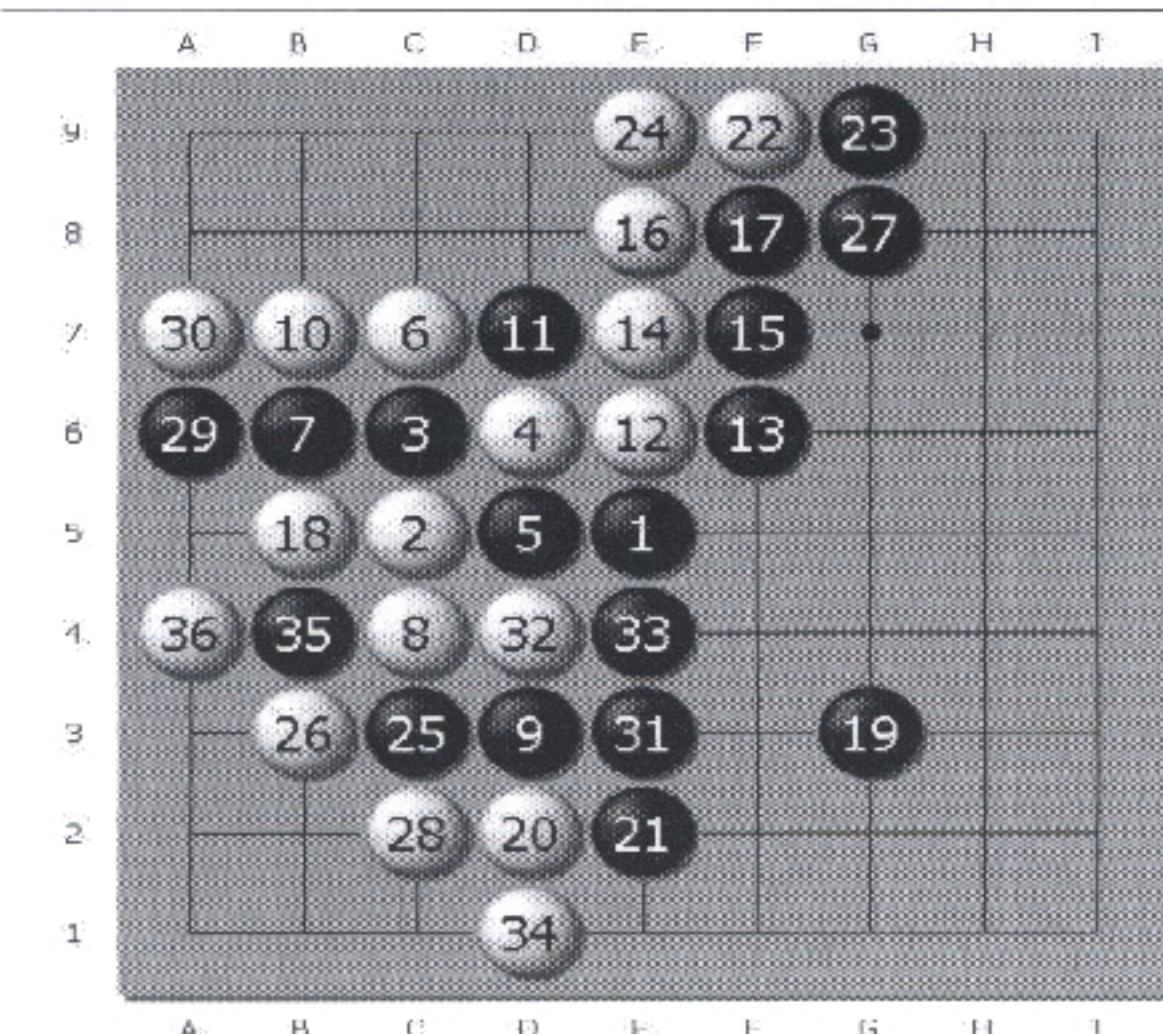
<sup>3</sup> Dept. of Information Management, Chang Jung Christian University, Tainan, Taiwan.

## 2. GAME RESULTS

In section A, ten Computer-Go programs coming from four countries participated in the competition at CJCJU. The tournament adopted the Swiss system and there were five rounds in total. Each program was required to complete its moves for one game within 30 minutes. Table 1 shows the participants of this event in alphabetical order. The tournament was won by MOGO. GO INTELLECT and JIMMY won second place and third place, respectively. In section B's invited games, several Taiwanese Go players, including one 9-Dan Professional (9P) Go player, Mr. Jun-Xun Zhou, and eight amateur Go players ranging from 1 Dan (1D) to 6D, were invited by NUTN to play with MOGO from September 26 to October 4, 2008. In particular, Mr. Zhou is the strongest Go player in Taiwan. He won the 2007 World LG-Cup. The detailed profiles of all the Go players competing with MOGO in Taiwan are listed in Table 2. Mr. Zhou played with MOGO running on a "Huygens" supercomputer with 800 CPUs through KGS Go server on September 27, 2008. MOGO lost three games against Mr. Zhou, including two 9×9 games (Game No. 15 and Game No. 16) and one 19×19 game (Game No. 17) with 7 handicap stones. MOGO had a very favourable situation in the first 9×9 game but made a big mistake and lost. Figures 1 and 2 show the game board of the game No. 15 and game No. 16. The detailed invited game results are listed in Table 3. Figure 3 (on p. 253) shows the picture when Mr. Zhou played with MOGO on September 27, 2008. Figure 4 (on p. 253) shows the picture after the game at NUTN with from left to right Professor Shun-Chin Hsu, Professor Chin-Seng Chen (President of CJCJU), Hsiu-Shuang Huang (President of NUTN), Mr. Jun-Xun Zhou, Mr. Cheng-Shu Chang, Dr. Olivier Teytaud (one of MOGO developers), Professor Chang-Shing Lee, and Professor Shang-Rong Tsai.

No	Program	Origine	No	Program	Origine
1	CHANGJUNG 1	Taiwan	6	GoKing	Taiwan
2	CPS	Taiwan	7	GoStar	China
3	ERICA	Taiwan	8	HappyGo	Taiwan
4	FUDO Go	Japan	9	JIMMY	Taiwan
5	GO INTELLECT	USA	10	MOGO	France

Table 1: Participants of World 9×9 Computer-Go Championship.

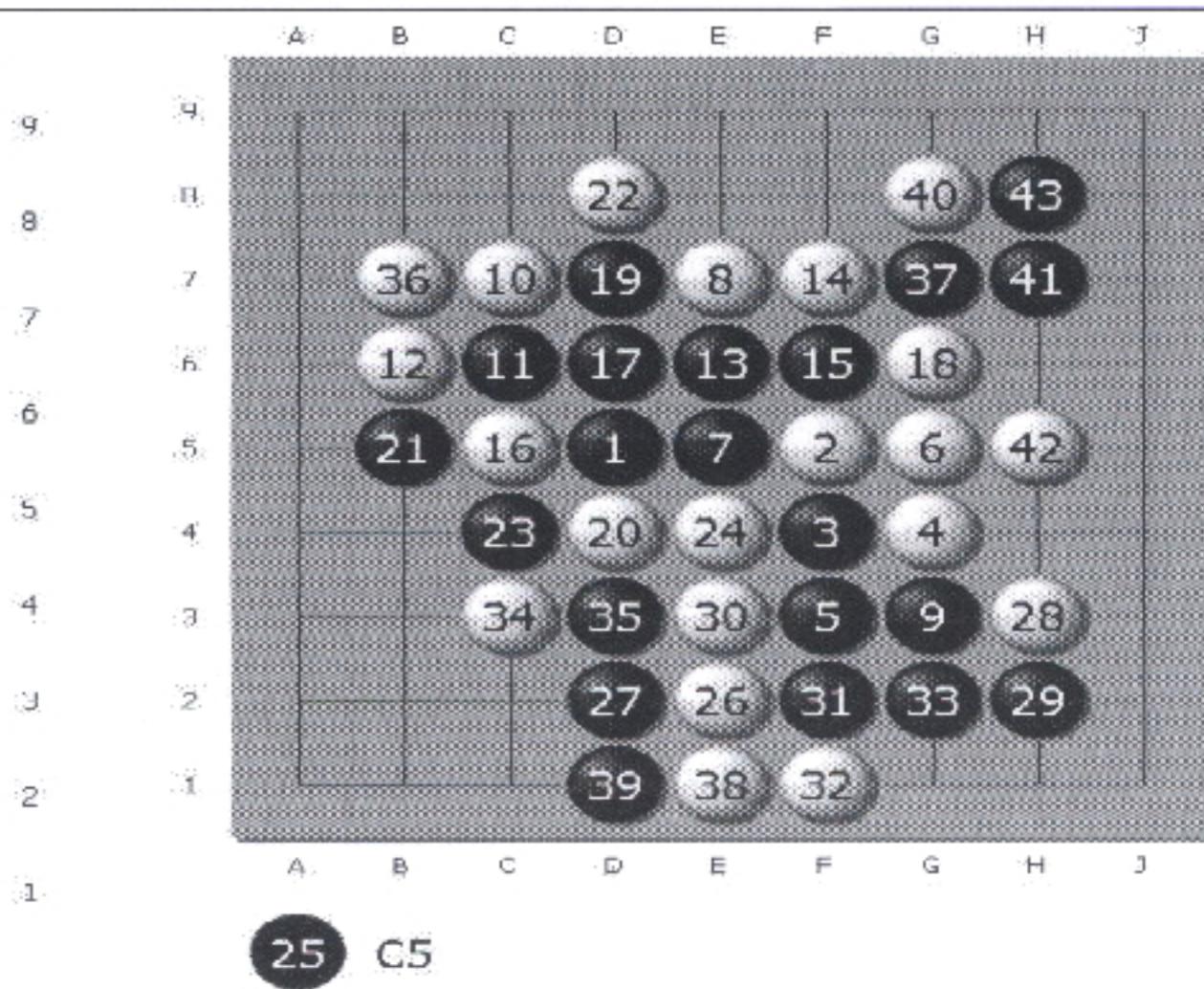


### Result:

9×9 game played against Mr. Zhou (9D Pro). MoGo was Black and lost the game.

**Comments by Prof. Tsai:** For White (Mr. Zhou) 20 was a good and effective move. After spending some time by thinking, Black answered 21 to White 20, but this bad move caused Black to lose a good chance to win. In contrast, if Black had played at E9 before 21, Black would have gained more than 4 points. In this way, maybe Black could have won.

Figure 1: Game No. 15.



### Result:

9×9 game played against Mr. Zhou (9D Pro). MoGo was White and lost the game.

**Comments by Prof. Tsai:** For White (MoGo) 16 was not a good move. If White had played 16 at B5 not C6, White would have had a much greater advantage, and many chances of winning the game.

Figure 2: Game No. 16.

No	Title	Name	Age	Sex	Dan grade
1	Mr.	Jun-Xun Zhou	28	Male	9P Professional
2	Mr.	Biing-Shiun Luoh	45	Male	6D Amateur
3	Prof.	Shang-Rong Tsai	55	Male	6D Amateur
4	Mr.	Cheng-Shu Chang	50	Male	6D Amateur
5	Prof.	Cheng-Wen Dong	70	Male	5D Amateur
6	Child	Yu-Shu Huang	12	Female	4D Amateur
7	Child	Yu-Xin Wang	11	Male	3D Amateur
8	Mr.	Wen-Tong Yu	50	Male	3D Amateur
9	Child	Sheng-Yu Tang	10	Male	2D Amateur

**Table 2:** Profiles of all the Go players competing with MoGo.

No	Date	Setup	Environment	White	Black	Result
1	08/26/2008	9×9	Huygens with 150CPUs	<b>MoGo</b>	Prof. Dong	W+0.5
2	08/26/2008	19×19 H5	Huygens with 150CPUs	Prof. Dong	<b>MoGo</b>	B+0.5
3	08/26/2008	9×9	Huygens with 150CPUs	Prof. Tsai	<b>MoGo</b>	B+Resign
4	08/26/2008	9×9	Huygens with 150CPUs	<b>MoGo</b>	<b>Mr. Luoh</b>	B+Resign
5	09/24/2008	19×19 H6	R900 machine	Prof. Dong	<b>MoGo</b>	B+Resign
6	09/24/2008	19×19 H4	R900 machine	Prof. Dong	<b>MoGo</b>	B+Resign
7	09/25/2008	19×19 H4	R900 machine	Prof. Dong	<b>MoGo</b>	B+Resign
8	09/25/2008	19×19 H4	R900 machine	Prof. Dong	<b>MoGo</b>	B+Resign
9	09/25/2008	19×19 H4	R900 machine	Prof. Dong	<b>MoGo</b>	B+0.5
10	09/25/2008	9×9	Huygens with 320CPUs	<b>Mr. Luoh</b>	MoGo	W+Resign
11	09/25/2008	9×9	Huygens with 320CPUs	MoGo	<b>Mr. Luoh</b>	B+Resign
12	09/25/2008	19×19 H4	Huygens with 320CPUs	<b>Mr. Luoh</b>	MoGo	W+Resign
13	09/27/2008	19×19 H5	Huygens with 480CPUs	Prof. Tsai	<b>MoGo</b>	B+1.5
14	09/27/2008	19×19 H5	Huygens with 480CPUs	Mr. Chang	<b>MoGo</b>	B+1.5
15	09/27/2008	9×9	Huygens with 800CPUs	<b>Mr. Zhou</b>	MoGo	W+Resign
16	09/27/2008	9×9	Huygens with 800CPUs	MoGo	<b>Mr. Zhou</b>	B+Resign
17	09/27/2008	19×19 H7	Huygens with 800CPUs	<b>Mr. Zhou</b>	MoGo	W+Resign
18	10/02/2008	19×19	R900 machine	<b>MoGo</b>	Mr. Yu	W+11.5
19	10/02/2008	19×19 H4	R900 machine	Mr. Luoh	<b>MoGo</b>	B+7.5
20	10/03/2008	19×19 H5	R900 machine	<b>Prof. Tsai</b>	MoGo	W+Resign
21	10/03/2008	19×19 H5	R900 machine	<b>Prof. Tsai</b>	MoGo	W+Resign
22	10/04/2008	19×19	R900 machine	Child Huang	<b>MoGo</b>	B+0.5
23	10/04/2008	19×19	R900 machine	Child Wang	<b>MoGo</b>	B+2.5
24	10/04/2008	9×9	R900 machine	Child Tang	<b>MoGo</b>	B+0.5

**Table 3:** Related information and results of the games that MoGo played against humans in the tournament.

### 3. CONCLUSION

In this report, the advances in computational intelligence as shown by MOGO are discussed with the help of Taiwan's Computer-Go tournaments. According to the comments made by the Taiwanese Go players, MOGO performs well in fighting and surrounding centre territory. In addition, MOGO shows adequate intelligence in exploiting a Go player's weakness to gain some points. Therefore, MOGO's playing strength may be around 1P professional for 9×9 and 2D-3D amateur for 19×19 games. However, MOGO still has some weaknesses such as its skill in corners and edges. The reason is that the Monte-Carlo player does not adequately deal with these issues. All in all, we may conclude that MOGO's performance in Taiwan was beyond the Taiwanese Go players' expectations. With the increasing advances in artificial intelligence and computational power, we hope and expect that the field of computer Go will make great progress in the near future.

### ACKNOWLEDGEMENT

The authors would like to thank the support by Professor Hsiu-Shuang Huang (President of National University of Tainan, Taiwan), Professor Chin-Seng Chen (President of Chang Jung Christian University, Taiwan), the Computer Center of National University of Tainan, especially Miss Meng-Chun Wang, and the Tainan Go Association, especially Mr. Biing-Shiun Luoh.

## MINUTES OF THE ICGA TRIENNIAL MEETING

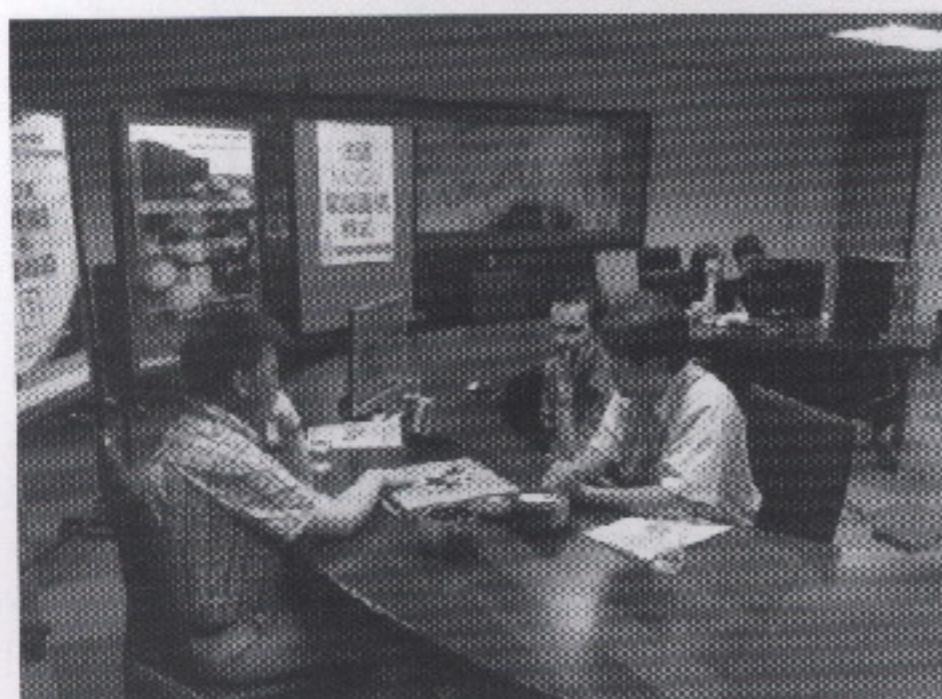
Beijing, September 30, 2008  
21.30 – 22.30 hours

*Hiroyuki Iida<sup>1</sup>*

Ishikawa, Japan

In accordance with the ICGA Constitution, the ICGA held its Triennial Meeting during the 16<sup>th</sup> World Computer-Chess Championship in Beijing, China. About 15 members attended the meeting. The agenda was: (1) Opening and welcome, (2) Minutes Meeting August 15, 2005, (3) Establishing the proposal for the revised constitution and bylaws, (4) Re-appointment of the ICGA's Editor-in-Chief, (5) Election of President, Vice-Presidents, and Secretary/Treasurer (6) Appointment for the Programmer's Representative, (7) The Treasurer's Report, (8) Past Events and Future Events, (9) Any other business and Closing.

1. The President opened the meeting by his welcome address.
2. The minutes were accepted and approved with thanks to Iida.
3. The President is delighted with the increase of the number of Asian participants and the expansion of CS research in Asia. The proposal is to elect a 2<sup>nd</sup> Vice-President. The recommendation of the ICGA board for Vice-President of Asia was voted for with big approval.
4. The President announced the re-appointment of the Editor-in-Chief for the next three-year period. He expressed his gratitude to Jaap van den Herik and his team for the excellent work.
5. The Election of the following candidates was approved. President: David Levy; Vice-Presidents: Yngvi Björnsson and Xinhe Xu; Secretary/Treasurer: Hiroyuki Iida.
6. For the programmer's representative the Board nominated Rémi Coulom. This was approved by the meeting.
7. The secretary/treasurer reported on the finances (see *ICGA Journal*, Vol. 31.1). At the moment we have about 200 members, in the past 650 at the most. For the future, finding sponsors is the main issue.
8. The President mentions the successful past FIDE event in Turin (2006) and hopes on their interest again. Amsterdam (2007) was a big success and now this holds for Beijing (2008) too. The events are important as principal source of income. The ICGA cannot survive without it. Analogously to FIDE we request from the host with a fee. The President asks every member to look for sponsors and explain the benefit from these events to them. Euro 40,000 is not much for a company or government. We have now a sign of interest from five countries.
- Amir Ban asks what would make the sponsor interested. Reply by Levy: they support the ICGA by 40,000 for the WCCC, the Olympiad and a prestigious scientific conference. It is good publicity in particular the scientific conference.
9. No questions were posed. The President closes the meeting at 22.00 hours.



**Figure 3:** Mr. Zhou against MoGo on Sept. 27, 2008.



**Figure 4:** After the game at NUTN.

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