

WCBC 2016: the 20th World Computer-Bridge Championship

Alvin Levy¹

Commack, New York State, USA

The World Computer-Bridge Championship (WCBC), hosted by the American Contract Bridge League (ACBL) and World Bridge Federation (WBF), is held annually at a major human championship. The 20th Ourgame World Computer-Bridge Championship was held September 10th-15th 2016 alongside the World Bridge Federation's World Bridge Games in Wroclaw, Poland.

Table 1
The participants in WCBC 2016

Robot	Author	State	Website	RR VPs	Pos.
Bridge Baron	Stephen Smith	USA	www.bridgebaron.com	89.21	3 Q
Meadowlark Bridge	Rodney Ludwig	USA	—	0.89	8 —
Micro Bridge	Tomio and Yumiko Uchida	JPN	www.osk.3web.ne.jp/~mcbridge	90.07	2 Q
Q-Plus Bridge	Hans Leber	DEU	www.q-plus.com	78.76	5 —
Robobridge	Job Scheffers	NLD	www.robobridge.com	50.58	7 —
Shark Bridge	John and Merete Vermehren Norris	DNK	www.sharkbridge.dk	80.12	4 Q
Wbridge5	Yves Costel	FRA	www.wbridge5.com	91.87	1 Q
Xinrui	Yuzhang Liu	CHN	xinruibridge.com	78.50	6 —

The tournament format opened with a 7-round, 32-board all-play-all between the eight participating programs of Table 1, some deals being taken from the human tournament for comparison purposes (Levy, 2017b). The top four robots, see Table 2, advanced to the 64-board knockout semi-final. Each robot is represented by four clones, two as N-S on 'Table 1', two as E-W on 'Table 2' with the same cards dealt. All clones run on identical 'Intel® Core™ i7' computers and each pair has 1m/board.

The Round Robin

In the last round, SHARK BRIDGE picked up 18 IMPs to help take the final qualifying position. The pickup depended on expert play by SHARK BRIDGE and the location of the diamond queen.

Opening lead ♠A from Figure 1. XINRUI, naturally playing South for short diamonds, lost to the ♦Q and went down 1, -100. At the other table, with opening lead ♠A, SHARK BRIDGE ruffed the ♠A and followed by the ♥K and ♥Q, revealing the problematic trump break. A trump coup was now needed to make the contract. This required picking up the ♦Q and North holding at least three clubs and at least two diamonds, so SHARK BRIDGE cashed three rounds of clubs, and cashed the diamond ace and a low diamond to the ten! Now running the clubs produced the needed trump coup. Note that two rounds of diamonds must be played before running playing the fourth club as North will discard a diamond and defeat the contract. +1660, and 18 Imps to SHARK BRIDGE.

¹ al@allevybridge.com

Table 2
The cross-table of scores in the round-robin phase.

Players	Wbridge5	Micro Bridge	Bridge Baron	Shark Bridge	Q-Plus Bridge	Xinrui	Robo-Bridge	Meadow-Lark Bridge	Total VPs	Pos.
Wbridge5	Imps rnd VPs	77-83 rnd 7 8.73	66-89 rnd 3 5.76	109-82 rnd 4 14.82	88-75 rnd 6 12.60	76-61 rnd 2 12.95	109-64 rnd 5 17.01	266-14 rnd 1 20.00	91.87	1 Q
Micro Bridge	83-77 rnd 7 11.27	Imps rnd VPs	65-104 rnd 6 3.65	78-38 rnd 3 16.46	53-46 rnd 2 11.47	77-80 rnd 5 9.35	94-40 rnd 1 17.87	172-8 rnd 4 20.00	90.07	2 Q
Bridge Baron	89-66 rnd 3 14.24	104-65 rnd 6 16.35	Imps rnd VPs	71-91 rnd 2 6.06	69-100 rnd 5 4.63	67-57 rnd 1 12.05	84-49 rnd 4 15.88	237-7 rnd 7 20.00	89.21	3 Q
Shark Bridge	82-109 rnd 4 5.18	38-78 rnd 3 3.54	91-71 rnd 2 13.94	Imps rnd VPs	81-65 rnd 1 13.12	112-67 rnd 7 17.96	67-86 rnd 6 6.38	172-8 rnd 5 20.00	80.12	4 Q
Q-Plus Bridge	75-88 rnd 6 7.40	46-53 rnd 2 8.53	100-69 rnd 5 15.37	65-81 rnd 1 6.88	Imps rnd VPs	42-65 rnd 4 5.76	112-85 rnd 7 14.82	234-1 rnd 3 20.00	78.76	5 —
Xinrui	61-76 rnd 2 7.05	80-77 rnd 5 10.65	57-67 rnd 1 7.95	67-122 rnd 7 2.04	65-42 rnd 4 14.24	Imps rnd VPs	106-65 rnd 3 16.57	135-1 rnd 6 20.00	78.50	6 —
RoboBridge	64-109 rnd 5 2.99	40-94 rnd 1 2.13	49-84 rnd 4 4.12	86-67 rnd 6 13.62	85-112 rnd 7 5.18	65-106 rnd 3 3.43	Imps rnd VPs	81-11 rnd 2 19.11	50.58	7 —
Meadowlark Bridge	14-266 rnd 1 0.00	0-172 rnd 4 0.00	19-134 rnd 7 0.00	7-237 rnd 5 0.00	1-234 rnd 3 0.00	1-135 rnd 6 0.00	11-81 rnd 2 0.89	Imps rnd VPs	0.89	8 —

Board 10 North
 Dlr: E ♠ T876
 Vul: both ♥ T743
 ♦ 84
 ♣ 932

West East
 ♠ — ♠ QJ
 ♥ KQ92 ♥ J865
 ♦ KT73 ♦ AJ92
 ♣ AQ854 ♣ KJT

South
 ♠ AK95432
 ♥ A
 ♦ Q65
 ♣ 76

Table 1 ...

West	North	East	South
Xinrui	Shark Bridge	Xinrui	Shark Bridge
6♦	All Pass	1♦	4♠

Table 2 ...

West	North	East	South
Shark Bridge	Xinrui	Shark Bridge	Xinrui
1♥	Pass	1♦	1♠
Dbl	Pass	2♥	4♠
4NT	Pass	5♣ ¹	Pass
6♥	Pass	Pass	Dbl
All			

¹ 1 kevcard

Fig. 1. SHARK BRIDGE – XINRUI: hands and bidding at the two tables.

Board 4							
Dlr: W		North		North			
Vul: None		♠ 532		♠ 53			
		♥ AQJ4		♥ AQ4			
		♦ Q3		♦ —			
		♣ A653		♣ —			
West		East		West		East	
♠ AQ6		♠ JT984		♠ AQ		♠ JT	
♥ K8732		♥ T5		♥ K87		♥ T	
♦ T		♦ J74		♦ —		♦ —	
♣ QJ84		♣ KT7		♣ —		♣ KT	
		South		South			
		♠ K7		♠ K7			
		♥ 96		♥ 9			
		♦ AK98652		♦ 2			
		♣ 92		♣ 9			
West	North	East	South				
Shark Bridge	Wbridge5	Shark Bridge	Wbridge5				
1♥	Pass	1♠	2♦				
2♠	Dbf ¹	Pass	3♥ ²				
Pass	4NT	Pass	5♦ ³				
Pass	6♦	All Pass					

¹ strength with 4+ clubs
² spade stopper, looking for heart stopper for NT
³ 1 ace

Fig. 2. WBRIDGE5 - SHARK BRIDGE: a) initial hands and bidding, and b) several cards in.

The semi-final matches

In the 64-board semi-finals, WBRIDGE5 narrowly defeated SHARK BRIDGE, 140.6 – 131, and MICRO BRIDGE narrowly defeated BRIDGE BARON 144 – 138.

An expertly played deal by WBRIDGE5 early in the semi-final match, produced the margin of victory, see Figure 2. Opening lead ♣Q: with West long in hearts, without the club king, therefore the spade ace, a heart-spade squeeze without the count, is the marked play. For success diamonds must be 2-2 or 3-1 with a stiff honor with West as declarer needs two entries to hand, one to take one heart finesse and one to run the diamonds. Diamond queen overtaken with the ace caters to both possibilities. The play proceeds: club ace; diamond queen overtaken with the ace; heart finesse, diamond finesse (restricted choice); running diamonds and on the last diamond, West had no safe discard.

From Figure 2b, at the table, West discarded the ♠Q, declarer led a spade to West's stiff ace and West had to return a heart, +1370 and 15 Imps as Shark Bridge was in 3♦ for +150.

In the MICRO BRIDGE versus BRIDGE BARON match, BRIDGE BARON was in 3♦ +130 and WBRIDGE5 was in 5♦ +620, and 10 Imps to MICRO BRIDGE. The opening lead against 5♦ was a low heart, finessed, and on the run of diamonds West was similarly squeezed.

Note that the play must be the same to make 5♦ or 6♦. This deal was played in the quarter-finals of the human team championships (Open, Women's, Senior, Mixed). Of the 32 times the deal was played by humans, the contracts were 3NT by South (16) making; 3NT by North, down (3); 3♦ (7); 3♠ by East (2); 5♦, down (2), making with an overtrick (1); and 6♦ (1) making. The declarers that made 5♦ and 6♦ received the spade ace lead, so their play was not tested. The two other declarers in 5♦ received less friendly leads and did not find the best play. In the 4 times 5♦ and 6♦ were played, the robots defended and declared better than the humans.

Board 63			
Dir: S		North	
Vul: E-W		♠ JT43	
		♥ AQT98	
		♦ AKQ	
		♣ A	
West		East	
♠ AQ872		♠ 5	
♥ 732		♥ K5	
♦ J43		♦ T8765	
♣ K5		♣ T8632	
South			
♠ K96			
♥ J64			
♦ 92			
♣ QJ974			
West	North	East	South
Shark Bridge	Wbridge5	Shark Bridge	Wbridge5
Pass	2♣	2NT	Pass
3♦	3♥	Pass	4♥
All Pass			

Fig. 3. The WBRIDGE5 - SHARK BRIDGE semi-final: hands and bidding.

With two boards to play, and both semi-final matches almost even, the drop of a singleton king offside decided both matches.

Opening lead ♠5, see Figure 3. West won the opening lead with the ♠Q, cashed the ♠A and led the ♠7 for East to ruff. East returned a club, West playing the King. With West a passed hand, East was marked for the heart king, and likely 1-2-5-5, so WBRIDGE5 got it right and dropped the stiff ♥K. No blood as 4♥ was also made by SHARK BRIDGE, but a needed play by WBRIDGE5 to win the match.

In the other semifinal match, at one table BRIDGE BARON reached 4♥ with no opposing bidding. The ♠5 was led, and after the ♠Q, ♠A and ruff by East, a diamond was returned. BRIDGE BARON, not locating the ♣K, ruffed the third diamond and took the heart finesse for down one. At the other table, MICRO BRIDGE was in a safer 3NT contract, making 4, picking up 10 Imps and the victory.

The final

It was WBRIDGE5 versus MICRO BRIDGE for the title.

With just two boards to go, WBRIDGE5 overcame a 17 Imps deficit. At one table, MICRO BRIDGE went down one in 3♣-N, for -100.

At the other table, as in Figure 4a, after the opening bid ♣10, E-W cashed their three outside winners, ♣A, ♦A, ♦K. While this was not the best order of winning the three outside winners, it appeared that there was still a trump loser for down one, and the end of any chance of WBRIDGE5 coming back. However, appearances are deceiving as WBRIDGE5 perfectly executed the rarely seen Devil's coup, or the disappearing trump trick, to make the contract: winning the club return; pitching the ♦Q on the remaining high club; ruffing a club; ruffing a spade; ruffing a diamond; cashing the ♠A, pitching a club; ruffing a spade; returning the ♦9 and overruffing East's ♥J with the ♥K; and finessing West's ♥Q. +620 and 12 Imps.

Board 63				Board 64			
Dir: S		North		Dir: West		North	
Vul: N-S		♠ —		Vul: E-W		♠ QJT9763	
		♥ AT62				♥ Q5	
		♦ 9542				♦ Q4	
		♣ KQ863				♣ J5	
West		East		West		East	
♠ J64		♠ KT9852		♠ K		♠ A852	
♥ Q8		♥ J53		♥ K2		♥ JT87	
♦ AT76		♦ K3		♦ A762		♦ 985	
♣ AJ94		♣ T2		♣ K97642		♣ A8	
		South				South	
		♠ AQ73				♠ 4	
		♥ K974				♥ A9643	
		♦ QJ8				♦ KJT3	
		♣ 75				♣ QT3	
West	North	East	South	West	North	East	South
Micro Bridge	Wbridge5	Micro Bridge	Wbridge5	Wbridge5	Micro Bridge	Wbridge5	Micro Bridge
Pass	1♥	2♠	1♦	1♣	3♠	3NT	All Pass
3♠	4♥	All Pass	3♥				

Fig. 4. The WBRIDGE5 – MICRO BRIDGE final, hands and bidding: a) Board 63 and b) Board 64.

On the last board, with MICRO BRIDGE up by 5 Imps, WBRIDGE5 needed to make its 3NT contract to take the title.

Opening lead ♠4, see Figure 4(b). A diamond opening lead or return when N-S first gets in is needed to defeat 3NT. The spade lead was won by the king and a club was ducked to South. This sets up the club suit, assuming a 3-2 break, and retains an entry to cash the spade ace. South, in with the club ten, had one last chance to return a diamond, but returned a low heart, which would be right if declarer had the diamond queen and mis-guessed the heart position. WBRIDGE5 went up with the king and now had nine tricks and 10 Imps, overtaking MICRO BRIDGE at the last to take the title.

The play of the top finishing robots was at a high level, demonstrated by the deals shown in detail, in the WCBC's historical context and in comparison to human play (Levy, 2015, 2016, 2017a/b/c).

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Fig. 4. The 2016 participants in the 2016 World Computer Bridge Championship, and the author, Al Levy.

About the author

Al Levy is a retired Northrop Grumman ‘rocket’ scientist, academic and consultant with nearly one hundred peer-reviewed publications and two patents.

With a lifelong interest in Bridge, he is also an ACBL Diamond Life Master. He joined the ACBL board of directors in 1995, was ACBL President in 2003 and was elected to the World Bridge Federation Executive Council in the same year. Al originated the World Computer Bridge Championship in 1996 and has organized and run it annually ever since. He is now an Executive Vice-President and Technology Committee chair of the WBF, edited *The Laws of Rubber Bridge* in 2014 and continues to promote (Levy, 2017d), write about and administrate Bridge.