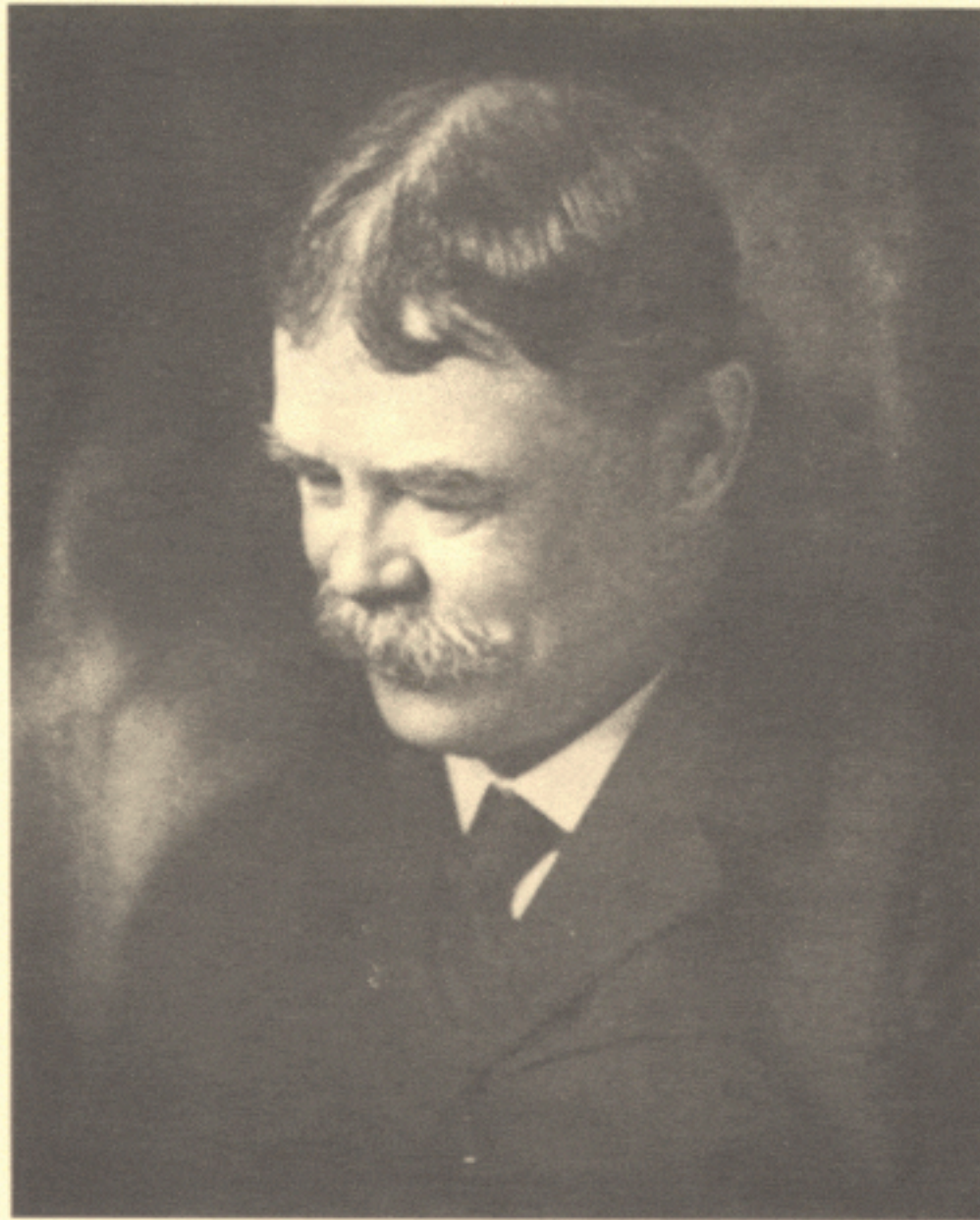


THE WILLIAM LOWELL PUTNAM MATHEMATICAL COMPETITION

ANNOUNCEMENT OF WINNERS

of the sixty-fourth annual competition held on December 6, 2003



WILLIAM LOWELL PUTNAM

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WINNING TEAMS

<i>Rank</i>	<i>School</i>	<i>Team Members (in alphabetical order)</i>
1	MASSACHUSETTS INSTITUTE OF TECHNOLOGY	Reid W. Barton, Daniel M. Kane, and Yevgeny K. Zaytman
2	HARVARD UNIVERSITY	Gabriel Carroll, George Lee, Jr., and Alexander B. Schwartz
3	DUKE UNIVERSITY	David G. Arthur, Nikifor C. Bliznashki, and Oaz Nir
4	CALIFORNIA INSTITUTE OF TECHNOLOGY	Zhihao Liu, Po-Ru Loh, and Po-Shen Loh
5	HARVEY MUDD COLLEGE	David J. Gaebler, Jason Murcko, and Andrew G. Niedermaier

The first place team receives an award of \$25,000 and each member of the team receives \$1,000. The awards for second place are \$20,000 and \$800; for third place \$15,000 and \$600; for fourth place \$10,000 and \$400; and for fifth place \$5,000 and \$200.

In each of the following categories, the listing is in alphabetical order.

THE PUTNAM FELLOWS—THE FIVE HIGHEST RANKING INDIVIDUALS

Each receives an award of \$2,500.

REID W. BARTON	Massachusetts Institute of Technology
ANA CARAIANI	Princeton University
✓ GABRIEL D. CARROLL	Harvard University
RALPH C. FURMANIAK	University of Waterloo
DANIEL M. KANE	Massachusetts Institute of Technology

THE NEXT ELEVEN HIGHEST RANKING INDIVIDUALS

Each receives an award of \$1,000.

DAVID G. ARTHUR	Duke University
ROBERT M. BARRINGTON LEIGH	University of Toronto
ALEX R. FINK	University of Calgary
✓ ANDREI JORZA	Harvard University
SUEHYUN KWON	Princeton University
✓ IAN TUAN-YEN LE	Harvard University
✓ RICKY I. LIU	Harvard University
PO-RU LOH	California Institute of Technology
SEVAK MKRTCHYAN	University of Pittsburgh
DAVID A. G. PRITCHARD	Massachusetts Institute of Technology
EMANUEL I. STOICA	Massachusetts Institute of Technology

THE NEXT TEN HIGHEST RANKING INDIVIDUALS

Each receives an award of \$250.

VLADIMIR BARZOV	Massachusetts Institute of Technology
✓ MICHAEL C. CATLIN	Harvard University
✓ BENJAMIN J. CONLEE	Harvard University
STEFAN L. HORNET	Princeton University
✓ GEORGE LEE, JR.	Harvard University
PO-SHEN LOH	California Institute of Technology
✓ VLADIMIR S. NOVAKOVSKI	Harvard University
ZHONGTAO WU	Massachusetts Institute of Technology
RUMEN I. ZAREV	California Institute of Technology
YEVGENY K. ZAYTMAN	Massachusetts Institute of Technology

HONORABLE MENTION—TEAMS

PRINCETON UNIVERSITY
UNIVERSITY OF BRITISH COLUMBIA
UNIVERSITY OF CALIFORNIA, BERKELEY
UNIVERSITY OF TORONTO

UNIVERSITY OF WATERLOO

Marius Beceanu, Stefan L. Hornet, and Mihai Manea
Daniel S. Brox, Nina Kamoosi, and Max Motlitski
Boris Bukh, Maksim I. Maydanskiy, and Austin W. Shapiro
Robert M. Barrington Leigh, Ali Feiz Mohammadi, and Roger S. K. Mong
Olena Bormashenko, Lino M. Demasi, and Ralph C. Furmaniak

HONORABLE MENTION—INDIVIDUALS

TIMOTHY G. ABBOTT, Massachusetts Institute of Technology
JEFFREY M. AMOS, Kansas State University
NIKOLAY V. ANDREEV, Massachusetts Institute of Technology
DANIEL S. BROX, University of British Columbia
PUNYASHLOKA BISWAL, Massachusetts Institute of Technology
NIKIFOR C. BLIZNASHKI, Duke University
✓ MAURO C. BRAUNSTEIN, Harvard University
EVAN M. BULLOCK, Rice University
✓ DUSTIN A. CARTWRIGHT, Harvard University
PO-NING CHEN, Massachusetts Institute of Technology
✓ IVAN Z. CORWIN, Harvard University
DORIAN E. CROITORU, University of Pittsburgh
LINO M. DEMASI, University of Waterloo
ANDREW J. DUDZIK, University of Chicago
MAKSYM FEDORCHUK, Massachusetts Institute of Technology
DAVID J. GAEBLER, Harvey Mudd College
✓ MICHAEL A. HAMBURG, Harvard University
TIANYI HAN, University of Toronto
JAMES W. HEGEMAN, California Institute of Technology
ROBERT D. HOUGH, Stanford University
YOUNGJUN JANG, Stanford University
✓ DANIEL C. JERISON, Harvard University

PRUMOOK KHUNGURN, Massachusetts Institute of Technology
HOANG M. LE, Bucknell University
PIERRE LE VAN, University of Ottawa
✓ MARK I. LIPSON, Harvard University
SEAN P. MARKAN, Massachusetts Institute of Technology
ROGER S. K. MONG, University of Toronto
ANDREW G. NIEDERMAIER, Harvey Mudd College
OAZ NIR, Duke University
SHENG-FONG PAI, University of Washington
VIRGIL C. PETREA, Massachusetts Institute of Technology
SHUBHANGI SARAF, Massachusetts Institute of Technology
NIKHIL A. SAVALE, Massachusetts Institute of Technology
✓ ALEXANDER B. SCHWARTZ, Harvard University
DAVID D. SHIN, Massachusetts Institute of Technology
✓ DAVID W. SIMMONS-DUFFIN, Harvard University
GARY L. SIVEK, Massachusetts Institute of Technology
SAWYER J. TABONY, University of Chicago
PAUL A. VALIANT, Stanford University
ASHER WALKOVER, Cornell University
MEHMET B. YENMEZ, California Institute of Technology
JINGJIN ZHANG, Tufts University

ELIZABETH LOWELL PUTNAM PRIZE

Winner receives an award of \$1,000.

ANA CARAIANI

Princeton University

QUESTIONS COMMITTEE

David Callan, University of Wisconsin, Madison (chair); Hugh Montgomery, University of Michigan, Ann Arbor; and Byron Walden, Santa Clara University.

A total of 3615 students from 479 colleges and universities in Canada and the United States participated in the Competition. There were teams from 401 institutions. More complete details will appear in the *American Mathematical Monthly*.

THE WILLIAM LOWELL PUTNAM MATHEMATICAL COMPETITION

March 5, 2004

Dear Colleague:

Enclosed is a report on your contestants in the 64th Competition and your team rank (if it was in the range 1—150), a list of the top 500 contestants (which you may wish to share with your committee on graduate students), an announcement of winners, and a list of participating schools. Some tables are given below. Your contributions to the Competition are greatly appreciated.

Leonard F. Klosinski, Director
Gerald L. Alexanderson, Associate Director
Loren C. Larson, Associate Director

<u>Score</u>	<u>Rank</u>	<u>Score</u>	<u>Rank</u>	<u>Score</u>	<u>Rank</u>	<u>Score</u>	<u>Rank</u>	<u>Score</u>	<u>Rank</u>	<u>Score</u>	<u>Rank</u>
110	1	69	23.5	51	66.5	35	151.5	28	245	13	576.5
96	2	68	25.5	50	72	34	154.5	27	257	12	641.5
95	3	67	27.5	49	76.5	33	158	26	264.5	11	739
90	4	66	29	48	81	32	166	25	270.5	10	905.5
82	5	64	30	47	84	31	180	24	278	9	1048.5
81	6.5	63	31	46	86	30.9	188.5	23	289.5	8	1120.5
80	9	62	32	44	89.5	30.8	191	22	311.5	7	1171.5
79	11	61	33.5	43	93.5	30.7	193.5	21	342.5	6	1177
78	12.5	60	40	42	99	30.6	195	20	403.5	5	1186
77	15	59	48	41	106.5	30.5	196	19	465.5	4	1222
75	17	58	51	40	117.5	30.4	198	18	498.5	3	1307
74	18	57	52.5	39	128.5	30.3	200	17	519	2	1542.5
73	19	56	54	38	137.5	30.2	201	16	526	1	2166.5
72	20	54	55	37	144.5	30	212	15	533	0	3113
71	21.5	52	59.5	36	148.5	29	229.5	14	549		

FREQUENCY DISTRIBUTION OF PROBLEM SCORES OF THE TOP 201 CONTESTANTS

	<u>A1</u>	<u>A2</u>	<u>A3</u>	<u>A4</u>	<u>A5</u>	<u>A6</u>	<u>B1</u>	<u>B2</u>	<u>B3</u>	<u>B4</u>	<u>B5</u>	<u>B6</u>	Total
10	149	55	10	15	27	18	62	119	97	120	31	10	713
9	3	25	1	4	0	6	6	13	35	12	6	0	111
8	29	8	7	5	1	4	4	4	20	11	19	0	112
7	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0
2	10	15	2	71	6	7	14	30	10	5	15	1	186
1	1	1	4	18	2	4	6	6	5	2	0	9	58
0	5	35	100	27	33	45	83	12	12	16	36	49	453
blank	4	62	77	61	132	117	26	17	22	35	94	132	779