THE WILLIAM LOWELL PUTNAM MATHEMATICAL COMPETITION

ANNOUNCEMENT OF WINNERS

of the seventy-third competition held on December 1, 2012

WINNING TEAMS

<table>
<thead>
<tr>
<th>Rank</th>
<th>School</th>
<th>Team Members (in alphabetical order)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>HARVARD UNIVERSITY</td>
<td>Eric K. Larson, Evan M. O'Dorney and Allen Yuan</td>
</tr>
<tr>
<td>2</td>
<td>MASSACHUSETTS INSTITUTE OF TECHNOLOGY</td>
<td>Benjamin P. Gunby, Brian C. Hamrick, and Jonathan Schneider</td>
</tr>
<tr>
<td>3</td>
<td>UNIVERSITY OF CALIFORNIA, LOS ANGELES</td>
<td>Xiangyi Huang, Tudor Paduraru, and Dillon Zhi</td>
</tr>
<tr>
<td>4</td>
<td>STONY BROOK UNIVERSITY</td>
<td>Thao T. Do, Dat Pham Nguyen, and Kevin R. Sackel</td>
</tr>
<tr>
<td>5</td>
<td>CARNEGIE-MELLON UNIVERSITY</td>
<td>Michael T. Druggan, Albert Gu, and Linus V. Hamilton</td>
</tr>
</tbody>
</table>

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.

BENJAMIN P. GUNBY
ERIC K. LARSON
MITCHELL M. LEE
ZIPEI NIE
EVAN M. O’DORNEY

Massachusetts Institute of Technology
Harvard University
Massachusetts Institute of Technology
Massachusetts Institute of Technology
Harvard University

THE NEXT ELEVEN HIGHEST RANKING INDIVIDUALS

Each receives an award of $1,000.

SORATHAN CHATURAPRUEK
OCTAV I. DRAGOI
WHAN GHANG
LINUS V. HAMILTON
ZHAORONG JIN
XIAOSHENG MU
TUDOR PADURARIU
SUNG GI PARK
Szu-po Wang
TIANYOU ZHOU
ALEX J. ZHOU

Harvey Mudd College
Harvard University
Massachusetts Institute of Technology
Carnegie-Mellon University
California Institute of Technology
Yale University
University of California, Los Angeles
Massachusetts Institute of Technology
Massachusetts Institute of Technology
Massachusetts Institute of Technology

THE NEXT NINE HIGHEST RANKING INDIVIDUALS

Each receives an award of $250.

JOSHUA H. ALMAN
HAN HAO
XIANGYI HUANG
HOLDEN LEE
BOWEI LIU
ARJUN R. PURANIK
JEFFREY D. SHEN
KA YU TAM
TONG ZHAN

Massachusetts Institute of Technology
New York University
University of California, Los Angeles
Massachusetts Institute of Technology
Princeton University
Stanford University
Massachusetts Institute of Technology
Massachusetts Institute of Technology
Yale University
HONORABLE MENTION—TEAMS

BRIGHAM YOUNG UNIVERSITY
NORTHWESTERN UNIVERSITY
PRINCETON UNIVERSITY
UNIVERSITY OF BRITISH COLUMBIA, VANCOUVER
YALE UNIVERSITY

Peter H. Baratta, Samuel Dittmer, and Hiram B. Golze
Siuyan Cai, Ewain Gwynne, and Zeyu Wang
Wesley Cao, Matthew C. Superdock, and Qiuyi (Richard) Zhang
Karliming Chen, (Ronnie) Ruiyuan Chen, and Eric Naslund
Danqing Liu, Xiaosheng Mu, and Tong Zhan

HONORABLE MENTION—INDIVIDUALS

ARKA ADHIKARI, Princeton University
FRANK D. BAN, University of Waterloo
ROBI C. BHATTACHARJEE, Massachusetts Institute of Technology
FRANCISC T. BOZGAN, University of California, Los Angeles
JUSTIN T. BRERETON, Massachusetts Institute of Technology
LUCAS CAMELO SA, Massachusetts Institute of Technology
KANGNING (COLIN) CHEN, University of Waterloo
KARLMING CHEN, University of British Columbia
KEVIN Y. CHEN, Massachusetts Institute of Technology
RUIYUAN (RONNIE) CHEN, University of British Columbia
ALEXANDER R. COLE, Massachusetts Institute of Technology
DAVID A. CORWIN, Princeton University
MICHAEL COHEN, Massachusetts Institute of Technology
EUGENI S. DIMITROV, Princeton University
THAO T. DO, Stony Brook University
MICHAEL T. DRUGGAN, Carnegie-Mellon University
MILES D. EDWARDS, Indiana University
ZHENG FAN, Massachusetts Institute of Technology
RAVI K. FERNANDO, Stanford University
MENDEL M. FRIEDMAN, Touro College
HIRAM B. GOLZE, Brigham Young University
EWAINE N. GWYNNE, Northwestern University
BRIAN C. HAMRICK, Massachusetts Institute of Technology
XIAOYU HE, Harvard University
JIAOYANG HUANG, Massachusetts Institute of Technology
HYUN SUB HWANG, Massachusetts Institute of Technology
SANTHOSH KARNIK, Georgia Institute of Technology
INDRAANEEL G. KASMALKAR, University of California, Berkeley
SAM G. KELLER, Stanford University
BUMSOO KIM, Princeton University

KUAN-YU LIN, Massachusetts Institute of Technology
ALEKSANDAR A. MAKELOV, Harvard University
ERIC L. MANNES, Massachusetts Institute of Technology
OFIR NACHUM, Massachusetts Institute of Technology
DAT PHAM NGUYEN, Stony Brook University
TUNG D. NGUYEN, Illinois Wesleyan University
ANTE QU, Princeton University
JOSEPH L. RICHEY, University of Michigan, Ann Arbor
ZEV S. ROSENGARTEN, Princeton University
KEVIN R. SACK, Stony Brook University
JONATHAN T. SCHNEIDER, Massachusetts Institute of Technology
TONGJIA SHI, Harvey Mudd College
ALEXANDER D. SMITH, Princeton University
HAO SUN, University of Waterloo
MATTHEW C. SUPERDOCK, Princeton University
BRANDON V. TRAN, Massachusetts Institute of Technology
NICHOLAS G. TRIANTAFILLOU, University of Michigan, Ann Arbor
MARK L. VELEDNITSKY, Massachusetts Institute of Technology
ANDERSON S. WANG, Massachusetts Institute of Technology
ANTHONY Y. WANG, Massachusetts Institute of Technology
SUNGSEOB WHANG, Brown University
MICHAEL Q. WU, Massachusetts Institute of Technology
GEORGE L. XING, Massachusetts Institute of Technology
KERRY K. XING, Massachusetts Institute of Technology
DAI YANG, Massachusetts Institute of Technology
WIJIT YANGJIT, Rensselaer Polytechnic Institute
ALLEN YUAN, Harvard University
ZEYIN ZHANG, University of Michigan, Ann Arbor
JONATHAN ZUNG, University of Toronto

QUESTIONS COMMITTEE

George T. Gilbert (Chair), Texas Christian University; Djordje Miličević, Bryn Mawr College; and Hugh Montgomery, University of Michigan, Ann Arbor.

A total of 4277 students from 578 colleges and universities in Canada and the United States participated in the Competition. There were teams from 402 institutions. More complete details will appear in the American Mathematical Monthly.

March 7, 2013

Leonard F. Klosinski, Director; Gerald L. Alexanderson and Mark Krusemeyer, Associate Directors
Dear Colleague:

Enclosed is a report on your contestants in the 73rd 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
Mark Krusemeyer, Associate Director

FREQUENCY DISTRIBUTION OF PROBLEM SCORES OF THE TOP 189 CONTESTANTS

<table>
<thead>
<tr>
<th></th>
<th>A1</th>
<th>A2</th>
<th>A3</th>
<th>A4</th>
<th>A5</th>
<th>A6</th>
<th>B1</th>
<th>B2</th>
<th>B3</th>
<th>B4</th>
<th>B5</th>
<th>B6</th>
<th>total</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>142</td>
<td>151</td>
<td>49</td>
<td>5</td>
<td>8</td>
<td>3</td>
<td>174</td>
<td>84</td>
<td>44</td>
<td>25</td>
<td>2</td>
<td>15</td>
<td>702</td>
</tr>
<tr>
<td>9</td>
<td>28</td>
<td>21</td>
<td>31</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>9</td>
<td>14</td>
<td>2</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>111</td>
</tr>
<tr>
<td>8</td>
<td>14</td>
<td>8</td>
<td>13</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>12</td>
<td>3</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>52</td>
</tr>
<tr>
<td>7</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>6</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>5</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>4</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>0</td>
<td>16</td>
<td>0</td>
<td>3</td>
<td>0</td>
<td>3</td>
<td>20</td>
<td>4</td>
<td>3</td>
<td>0</td>
<td>3</td>
<td>54</td>
</tr>
<tr>
<td>1</td>
<td>0</td>
<td>0</td>
<td>11</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>17</td>
<td>27</td>
<td>1</td>
<td>1</td>
<td>10</td>
<td>73</td>
</tr>
<tr>
<td>0</td>
<td>1</td>
<td>7</td>
<td>25</td>
<td>97</td>
<td>60</td>
<td>52</td>
<td>0</td>
<td>20</td>
<td>48</td>
<td>95</td>
<td>18</td>
<td>33</td>
<td>456</td>
</tr>
<tr>
<td>blank</td>
<td>2</td>
<td>2</td>
<td>44</td>
<td>85</td>
<td>115</td>
<td>131</td>
<td>1</td>
<td>22</td>
<td>61</td>
<td>62</td>
<td>167</td>
<td>128</td>
<td>820</td>
</tr>
</tbody>
</table>