



# United States National Chemistry Olympiad

*40<sup>th</sup> Summary Report*



2023



# U.S. NATIONAL CHEMISTRY OLYMPIAD

## 40<sup>th</sup> SUMMARY REPORT

2023

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## 2023 CHEMISTRY OLYMPIAD COMPETITION

The 55th International Chemistry Olympiad (IChO) was held in person for the first time since 2019 and hosted by Switzerland in Zurich from July 16-25, 2023. This year 348 students from 89 countries participated in the competition. Team USA earned two gold and two silver medals.

The American Chemical Society (ACS), and other donors supported the participation of the U.S. Alpha Rho team. **Anurag Sodhi** from Centennial High School, MD (Maryland Local Section) and **Phoenix Wu** from Seven Lakes High School, TX (Greater Houston Local Section) both earned gold medals while **Alice Liu** from Marquette High School, MO (St. Louis Local Section) and **Mingwen Duan** from East Lyme High School, CT (Connecticut Valley Local Section) won silver medals, placing 18<sup>th</sup>, 19<sup>th</sup>, 61<sup>st</sup>, and 69<sup>th</sup> respectively.

This year 151 Local Sections registered for the competition and a majority organized exams using the digital exam provided by US National Chemistry Olympiad (USNCO) office and proctored by local sections virtually using different platforms such as Zoom, while some hosted in person exams. A total of 128 Local Sections nominated 898 students to sit for the national exam administered during April 15-26, 2023.

The twenty students who topped the national examination were invited to participate in the study camp June 4-17, 2023 hosted at the campus of the University of Maryland College Park (UMD). Students received training in various major areas of chemistry by faculty of the University of Maryland College Park, Department of Chemistry and Biochemistry, and from mentors Mrs. Esther Hines (chemistry teacher, Billerica Memorial High School, MA), Dr. Laura Serbulea (associate chemistry professor, University of Virginia, VA), Dr. Songwen Xie (associate chemistry professor, Massachusetts College of Pharmacy and Health Sciences, MA) and Dr. Joseph Houck (associate chemistry professor, Penn State University, PA). Students participated in guest lectures given by: Dr. Teri Quinn Gray, (Provi Inc. CA), Dr. David MacMillan- 2021 Nobel Prize winner in chemistry (Princeton University, NJ), Dr. Natalie LaFranzo (LINUS, MA), Dr. John Warner (Beyond Benign, MA), Dr. Efrain Rodriguez (University of Maryland, MD), Dr.'s Kathy Lee and Steve Wright (Pfizer.Inc., MA) and Dr. Glenn Amatucci (Rutgers University, NJ).

Students also enjoyed recreational activities such as sightseeing in Washington DC with a Monuments by Moonlight Trolley Tour, Sunday BBQ at the Frat House, bowling and pizza at the UMD's Terp Zone, as well as a visit to the National Institute of Standards and Technology.

Dr. Judith C. Giordan, 2023 ACS President, was a keynote speaker at the Study Camp banquet for the students held at Samuel Riggs IV Alumni Center at UMD. Dr. Terri Chambers, Senior Director, Education Division, ACS, joined students at the banquet and delivered opening remarks.

At the conclusion of the camp, the members of the Team USA and two alternates were selected. The 2023 alternates were: 1st alternate: Sebastian Kumar, Tesla STEM High School, WA, (Puget Sound Local Section), 2nd alternate: Brian Li, Acton-Boxborough Regional High School, MA, (Northeastern Local Section).

The 55th IChO was hosted in Zurich, Switzerland, between July 16 and 25, 2023. The Opening Ceremony was hosted at ETH in Zurich. During their time at IChO the mentors examined the

labs, reviewed, translated, and then graded the exams and participated in the International Jury meetings of the IChO. The students first took the 5-hour laboratory exam and a day later another 5-hour theoretical exam. The organizers prepared a rich program that included exploring ETH Zurich as well as the research institutes Empa, Eawag, and PSI, *Finding Solutions Fair* at ETH Zurich with partners and research groups, *Career Evening* panel discussion in two groups about career paths in chemistry, visit to Metrohm AG as well as Lonza Group, and sightseeing tours in Zurich, Bern, Lucerne, Mount Rigi, and Mount Säntis. The reunion party was hosted at University of Zurich where students met mentors and could discuss the exams. The closing ceremony took place in the Tonhalle, a historic concert hall in Zurich. All recipients of Honorable Mentions and winners of bronze, silver, and gold medals were announced and participants received their medals and certificates on stage. The ceremony was followed by a farewell dinner in the adjoining Congress Hall Zurich. All delegations departed home the day after the closing ceremony.

The American Chemical Society views the USNCO program as an investment in the future of young chemists in this country. The goals of the program are to:

- stimulate young people to achieve excellence in chemistry;
- recognize outstanding chemistry students and, by doing so, encourage additional learning at a formative time in their intellectual development;
- recognize the excellent achievement of the teachers of these students and the importance of the school environment in which they learn;
- promote contact between ACS local sections and area schools and foster the interest and influence of professional chemists in the teaching of chemistry;
- challenge the chemical knowledge and skills of young students in an international arena; and,
- foster cross-cultural experiences and acquaint students with similarities and differences between themselves and their counterparts in other nations.

Since 1984, the USNCO program has been sponsored by the Donald F. and Mildred Topp Othmer Chemistry Olympiad Endowment.

The following corporations and donors supported the program through financial support and in-kind donations:

- **Carolina Biological**  
Laboratory goggles and gloves
- **Pearson Education Company**  
Physical and inorganic chemistry textbooks
- **Texas Instruments Inc.**  
Scientific calculators

- **ThermoFisher Scientific**  
Laboratory coats
- **Individual private donors**

The ACS USNCO staff appreciates the dedication, enthusiasm, and contribution of time given by:

- The 2023 members of the USNCO Subgroup of the Society Committee on Education, which provided policy direction for this program,
- The members of the USNCO examinations task forces, the grading team, and the mentor selection task force,
- The faculty of the Department of Chemistry and Biochemistry of UMD College Park, and
- The mentors who taught and guided the 2023 Team Alpha Rho.

Thank you!



*Team Alpha Rho sightseeing in Washington DC. Photo by Songwen Xie.*

## PARTICIPATING ACS LOCAL SECTIONS

### Local Section (YP\*\*\*)

1. Akron (29)
2. \*Alabama (32)
3. Ames (30)
4. Auburn (12)
5. Baton Rouge (39)
6. Binghamton (37)
7. \*Brazosport (12)
8. California (40)
9. California Los Padres (25)
10. Carolina-Piedmont (26)
11. Central Arizona (36)
12. Central Arkansas (40)
13. Central Massachusetts (17)
14. Central New Mexico (38)
15. \*Central New York (38)
16. Central North Carolina (26)
17. Central Pennsylvania (37)
18. Central Texas (38)
19. \*Central Utah (31)
20. Chattanooga (37)
21. Chemical Soc. of Wash. (40)
22. Chicago (40)
23. Cincinnati (40)
24. Cleveland (37)
25. Columbus (37)
26. Connecticut Valley (40)
27. Dallas-Fort Worth (33)
28. Dayton (37)
29. Delaware (39)
30. Detroit (39)
31. East Central Illinois (9)
32. East Tennessee (34)
33. \*East Texas (29)
34. Eastern New York (37)
35. Eastern North Carolina (31)
36. Erie (38)
37. Florida (34)
38. Georgia (34)
39. Greater Houston (39)
40. Hampton Roads (39)
41. Hawaii (39)
42. \*Hong Kong Int. Chapter (12)
43. Huron Valley (30)
44. \*Idaho (38)
45. Illinois-Heartland (34)
46. Indiana Kentucky Border (34)
47. Indiana (40)
48. \*Inland Northwest (15)
49. Iowa (33)
50. Jacksonville (38)
51. Joliet (38)
52. Kanawha Valley (28)
53. Kansas City (39)
54. Lehigh Valley (36)
55. Lexington (16)
56. \*Louisiana (23)
57. Louisville (26)
58. Maine (34)
59. Malaysia Int. Chapter (3)
60. Mark Twain (35)
61. Maryland (35)
62. Memphis (38)
63. Michigan State University (38)

### Coordinator

Carol Kercher  
 Shirley Ginwright  
 Adam Wade  
 Catherine Situma  
 Sviatoslav Baranets  
 Clarice Kelleher  
 Bindu Krishnan  
 Eileen Nottoli  
 Ahmed Awad  
 Tim Champion  
 Richard Bauer  
 Noureen Siraj  
 Mathangi Krishnamurthy  
 Jacqueline Veauthier  
 Neal Abrams  
 Chris Fowler  
 Robert White  
 Anting Chen  
 Elena Laricheva  
 R. Stimson/E. Alonge  
 Adam Smolinsky  
 R. Kohnken/D. Crumrine  
 Jill Page  
 Anne O'Connor  
 Carrie Ross  
 Edward Fitzgerald  
 Kathleen Holley  
 Weijie Lu  
 S. Archer/Z. Yang  
 Mark DeCamp  
 Samuel Albright  
 Sylvia Pastor  
 Greg Hogan  
 Eric Davenport  
 Jason Pajski  
 Christine Saber  
 Nicholas Simpson  
 Ram Sabnis  
 Jerry Yang  
 S. Black/K. Simmons  
 Pamela Fujinaka  
 David Lee Phillips  
 Larry Kolopajlo  
 R. Rodriguez/B. Nelson  
 Udo Schnupf  
 Phillip Voegel  
 Robert Pribush  
 Parker Britton  
 Shuvendu Das  
 Michael Lufaso  
 Chris Condeiu  
 Michael Fultz  
 Alcinda Ruuskanen  
 Gail Marsella  
 Meghan Knapp  
 Abha Verma  
 Kaya Muller  
 Wilma Lombardi  
 Mohd Bakri Bakar  
 Scott Luaders  
 Beatrice Salazar  
 Dennis Merat  
 Virginia Cangelosi

### Local Section (YP\*\*\*)

64. Mid-Hudson (38)
65. Midland (38)
66. Milwaukee (37)
67. Minnesota (39)
68. Mississippi (28)
69. \*Mojave Desert (14)
70. MO-Kan-OK (22)
71. Nashville (36)
72. Nebraska (10)
73. New Haven (37)
74. New York (40)
75. North Carolina (38)
76. North Jersey (40)
77. Northeast Georgia (10)
78. Northeastern (40)
79. Northeastern Indiana (34)
80. Northeastern Ohio (21)
81. Northern Oklahoma (38)
82. Northern West Virginia (37)
83. Oklahoma (40)
84. Ole Miss (22)
85. Omaha (16)
86. Orange County (39)
87. Orlando (31)
88. \*Ouachita Valley (10)
89. \*Panhandle Plains (16)
90. Penn-Ohio Border (38)
91. \*Penn York (20)
92. \*Pensacola (39)
93. Philadelphia (39)
94. Pittsburgh (40)
95. Portland (38)
96. Princeton (28)
97. Puerto Rico (32)
98. Puget Sound (32)
99. \*Red River Valley (17)
100. Rhode Island (26)
101. Richland (31)
102. Rio Grande Valley (20)
103. Rochester (37)
104. \*Rock River (40)
105. \*Sabine Neches (22)
106. Sacramento (33)
107. Salt Lake (39)
108. San Antonio (38)
109. San Diego (39)
110. San Gorgonio (39)
111. San Joaquin Valley (12)
112. Savannah River (38)
113. Shanghai Int. Chapter (10)
114. Sierra Nevada (21)
115. Silicon Valley (37)
116. Sioux Valley (7)
117. Snake River (15)
118. South Carolina (36)
119. South Florida (31)
120. South Korea Int. Chapter (7)
121. South Plains (23)
122. South Texas (30)
123. Southeastern Pennsylvania (39)
124. Southern Arizona (21)
125. Southern California (40)
126. Southern Illinois (30)

### Coordinator

Joseph Tanski  
 Michael Tulchinsky  
 Wujie Zhang  
 Hoonseok Oh  
 Jonathan Broome  
 Patrick Fedick  
 Dilip Paul  
 Amanda Carroll  
 Martha Morton  
 Olivier Nicaise  
 Stephen Goldberg  
 Seth Anthony  
 Steven Chen  
 Maurice Snook  
 S. Lantos/A. Crosby  
 Robert Breece  
 Christopher Kolp  
 Keith Lawson  
 Harry Finklea  
 Reza Latifi  
 Jason Ritchie  
 Edmund Tisko  
 Brent Shenton  
 Mary Roslonowski  
 Siva Murru  
 Jarred Nusz  
 Michael Serra  
 Daniel Sadowsky  
 Patrick Barber  
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 Kristi Closser  
 K. Roberts/M. Fetterolf  
 Xuefeng Jiang  
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 Amy Rogers  
 Venkatesh Shanbhag  
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 Anthony Cozzolino  
 Ludivina Avila  
 Todd Trout  
 Iman Daryaei  
 G. Delker/B. Belmont  
 G. Kinsel/ M. Kinsel

## PARTICIPATING ACS LOCAL SECTIONS

<u>Local Section (YP***)</u>	<u>Coordinator</u>	<u>Local Section (YP***)</u>	<u>Coordinator</u>
127. Southern Indiana (8)	James Clark	140. Upper Peninsula (24)	Momoko Tajiri
128. Southern Nevada (38)	Thomas Gill	141. *Virginia Blue Ridge (21)	Kimberly Lane
129. *Southwest Georgia (37)	Yakov Woldman	142. Virginia (39)	Sarah Porter
130. St. Joseph Valley (38)	S. DeValle/K. Woolard	143. Wabash Valley (36)	Teresa Tarbuck
131. St. Louis (40)	Bruce Hamper	144. Wakarusa Valley (13)	Lisa Sharpe Elles
132. *Taiwan Int. Chapter (6)	I-Jy Chang	145. Washington-Idaho Border (12)	Kristopher Waynant
133. Tampa Bay (18)	Tony Pham	146. Western Carolinas (35)	John Kaup
134. TN-VA Highlands (33)	Rong Xu	147. Western Connecticut (39)	Amy Broderick
135. Texas A & M (15)	Daniel Collins	148. *Western Michigan (29)	Michelle DeWitt
136. Toledo (28)	Somnath Dutta	149. Western New York (38)	Mariusz Kozik
137. Trenton (39)	Danielle Jacobs	150. *Wichita (28)	James Titah
138. Tulsa (35)	Patrick Idwasi	151. Wichita Falls-Duncan (34)	Jianguo Shao
139. *University of Arkansas (13)	Julie Stenken		

\*Participated in the local section competition but not the National Exam

\*\*\* YP-Number of years participating in the USNCO

## USNCO STUDY CAMP PARTICIPANTS

<u>STUDENT/GRAD. YEAR</u>	<u>SCHOOL/TEACHER</u>	<u>LS/COORDINATOR</u>
Anantshri Asthana 2024	John Foster Dulles High School, TX Long Ngan	Greater Houston Jerry Yang
Luke Chen 2023	Blue Valley North High School, KS Amy Schulte	Kansas City Alcinda Ruuskanen
Nipun Dour 2023	Mira Loma High School, CA James Hill	Sacramento Borislava Bekker
Mingwen Duan 2024	East Lyme High School, CT Lori Singer	Connecticut Valley Edward Fitzgerald
Canaan He 2023	Carmel High School, IN Jennifer Drudge	Indiana Robert Pribush
James Jiang 2026	Buchholz High School, FL Alex Payne	Florida Nicholas Simpson
Sebastian Kumar 2023	Tesla STEM High School, WA Rick Herzog	Puget Sound Clarita Bhat
Brian Li 2023	Acton Boxborough Regional High School, MA Leah Marsh	Northeastern Steve Lantos
Yiwei Liang 2024	Princeton Int. School of Mathematics and Science, NJ Steven Chen	Princeton Danielle Jacobs
Yunyi Ling 2025	Montgomery Blair High School, MD Erik Lodal	Chemical Society of Washington Adam Smolinsky
Alice Liu 2024	Marquette High School, MO Edward Bolton	St. Louis Bruce Hamper
Arya Morasa 2025	Mira Loma High School, CA James Hill	Sacramento Borislava Bekker
Viraj Negandhi 2023	John Foster Dulles High School, TX Long Ngan	Greater Houston Jerry Yang
Yash Shah 2025	Panther Creek High School, NC Courtney Wayand	North Carolina Seth Anthony
Anurag Sodhi 2024	Centennial High School, MD Robert Astri	Maryland Beatrice Salazar
Ethan Song 2024	West Windsor Plainsboro High School South, NJ Cynthia Jaworsky	Princeton Danielle Jacobs
Albert Tang 2024	The Westminster Schools, GA Tina Davis	Georgia Ram Sabnis
Aaron Wang 2024	Conestoga High School, CA Scott Best	Philadelphia Craig McClure
Phoenix Wu 2023	Seven Lakes High School, TX Jose Ramos	Greater Houston Jerry Yang
Annie Xu 2024	Mission San Jose High School, CA Oana Seremeta	California Eileen Nottoli



## 55th INTERNATIONAL CHEMISTRY OLYMPIAD RESULTS

In the 55th International Chemistry Olympiad 87 countries and 8 individual participants competed. Out of 348 participants, 39 students received gold, 71 students received silver, 107 students received bronze medals and 27 students received Honorable Mentions.

COUNTRY (number of years of participation)	MEDALS	COUNTRY (number of years of participation)	MEDALS
1. Argentina (27)	1 silver, 3 bronze	46. Moldova (16)	2 bronze, 1 HM
2. Armenia (8)	1 gold, 2 bronze, 1 HM	47. Mongolia (17)	2 bronze, 1 HM
3. Australia (36)	2 silver, 2 bronze	48. Montenegro (9)	
4. Austria (48)	1 silver, 3 bronze	49. Nepal (2)	1 HM
5. Azerbaijan (24)	4 bronze	50. Netherlands (43)	1 bronze, 3 HM
6. Bangladesh (3)	1 bronze	51. New Zealand (31)	1 silver, 3 bronze
7. Belgium (43)	1 bronze	52. Nigeria (11)	
8. Brazil (23)	3 silver, 1 bronze	53. North Macedonia (11)	3 bronze, 1 HM
9. Bulgaria (54)	2 gold, 2 silver	54. Norway (42)	2 bronze, 1 HM
10. Canada (37)	1 silver, 3 bronze	55. Oman (3)	
11. China (36)	4 gold	56. Pakistan (18)	1 HM
12. Chinese Taipei (24)	3 gold, 1 silver	57. Paraguay (2)	
13. Costa Rica (13)		58. Peru (17)	1 bronze 1 HM
14. Croatia (22)	4 bronze	59. Philippines (7)	3 bronze, 1 HM
15. Cuba (30)	2 bronze	60. Poland (55)	1 gold, 2 silver, 1 bronze
16. Cyprus (34)	1 bronze	61. Portugal (20)	1 bronze, 1 HM
17. Czech Republic (55)	2 silver, 2 bronze	62. Qatar (4)	
18. Denmark (43)	4 bronze	63. Romania (52)	1 gold, 2 silver, 1 bronze
19. Ecuador (2)		64. Saudi Arabia (13)	4 silver
20. El Salvador (11)	<b>1 HM</b>	65. Serbia (12)	1 silver, 2 bronze, 1 HM
21. Estonia (30)	3 bronze, 1 HM	66. Singapore (34)	4 gold
22. Finland (46)	1 bronze, 2 HM	67. Slovakia (29)	3 silver, 1 bronze
23. France (42)	1 silver, 2 bronze, 1 HM	68. Slovenia (32)	1 silver, 1 bronze, 2 HM
24. Georgia (10)	1 silver	69. South Africa (7)	
25. Germany (33)	1 gold, 1 silver, 2 bronze	70. Spain (27)	
26. Greece (28)	3 bronze, 1 HM	71. Sri Lanka (4)	4 bronze
27. Hungary (55)	1 gold, 3 silver	72. Sweden (48)	1 silver, 1 bronze
28. Iceland (22)	1 bronze	73. Switzerland (37)	1 HM
29. India (24)	1 gold, 3 silver	74. Syria (14)	2 silver, 2 bronze
30. Indonesia (27)	2 silver, 2 bronze	75. Tajikistan (19)	1 HM
31. Iran (31)	3 gold, 1 silver	76. Thailand (34)	1 gold, 2 silver, 1 bronze
32. Ireland (26)	1 bronze, 1 HM	77. Trinidad and Tobago (1)	
33. Israel (18)	3 silver, 1 bronze	78. Türkiye (31)	1 gold, 3 silver
34. Italy (39)	4 bronze	79. Turkmenistan (20)	1 silver, 3 bronze
35. Japan (21)	2 gold, 2 silver	80. Ukraine (29)	4 bronze
36. Kazakhstan (26)	1 gold, 2 silver, 1 bronze	81. UAE (4)	
37. Kuwait (1)		82. United Kingdom (41)	1 gold, 3 silver
38. Korea (33)	1 gold, 2 silver, 1 bronze	83. <b>USA (40)</b>	<b>2 gold, 2 silver</b>
39. Kyrgyzstan (24)	1 HM	84. Uruguay (25)	1 bronze
40. Latvia (33)	1 silver, 3 bronze	85. Uzbekistan (11)	2 gold, 1 silver, 1 bronze
41. Liechtenstein (1)		86. Venezuela (3)	
42. Lithuania (22)	1 silver, 3 bronze	87. Vietnam (28)	3 gold, 1 silver
43. Luxembourg (4)	1 bronze	Individual Participants	3 gold, 4 silver, 1 bronze
44. Malaysia (16)	1 silver, 1 bronze, 1 HM		
45. Mexico (32)	1 bronze		

USNCO NATIONAL EXAM STATISTICAL INFORMATION  
(TOTAL STUDENTS – 898)

<b>Gender</b>		
Male	472	72%
Female	183	28%
Other	n/a	
Prefer not to disclose	n/a	
<b>Responses</b>		655 100%
<b>Ethnic Background</b>		
African American	11	2%
Asian	377	58%
Hispanic	26	4%
White	183	29%
Native American	3	0%
Pacific Islander	2	0%
Prefer not to disclose	36	6%
Other	8	1%
Responses	646	100%
<b>Grade in School</b>		
12th Grade	126	19%
11th Grade	373	58%
10th Grade	120	18%
9th Grade	30	5%
Responses	649	100%
<b>Years of H.S. Chemistry</b>		
1	216	35%
2	385	60%
3	35	5%
4	3	0%
5 or more	0	0%
Responses	639	100%
<b>Average time per week spent doing experiments in HS Chemistry Lab</b>		
Less than ½ hour	240	41%
Between ½ and 1 hour	218	37%
Between 1 and 2 hours	108	19%
More than 2 hours	16	3%
Responses	582	100%
<b>Intended College Major</b>		
Biological Sciences/Pre-Medicine	173	23%
Chemistry or other Chemical Science	173	23%
Engineering/Mathematics/Physics	231	30%
Other Science discipline	58	8%
Other or undecided	123	16%
I am not planning to attend college	0	0%
Responses	758	100%

<b>As a result of participating in USNCO students: (96% responded)</b>	<b>Strongly agree</b>	<b>Agree</b>	<b>Disagree</b>	<b>Strongly disagree</b>
Plan to study more chemistry	45%	46%	6%	3%
Plan to major in chemistry	13%	34%	43%	10%
Have more positive view about chemistry	39%	47%	11%	3%

## USNCO STATISTICAL INFORMATION

	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
<b>Local Exam Local Sections</b>	45	90	115	133	138	137	142	142	136	140	138
<b>Natl. Exam Local Sections</b>	45	90	115	133	138	137	142	142	136	138	138
<b>Natl. Exam Nominees</b>	209	500	600	650	706	689	719	684	638	940	900
<b>Countries participating in IChO</b>	21	22	22	26	26	26	28	31	33	38	41
<b>Students participating in IChO</b>	76	83	86	103	104	104	111	118	131	149	156

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
<b>Local Exam Local Sections</b>	131	136	142	147	145	143	142	146	135	131	134
<b>Natl. Exam Local Sections</b>	121	130	127	134	130	126	121	133	130	125	128
<b>Natl. Exam Nominees</b>	875	840	838	880	851	809	796	850	829	800	909
<b>Countries participating in IChO</b>	42	45	47	55	51	54	54	57	59	61	59
<b>Students participating in IChO</b>	163	170	184	185	199	216	210	225	232	234	225

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
<b>Local Exam Local Sections</b>	133	139	127	129	133	135	141	141	143	144	142
<b>Natl. Exam Local Sections</b>	125	128	117	125	128	126	134	135	137	134	128
<b>Natl. Exam Nominees</b>	890	917	868	916	930	941	1034	1062	1011	1010	983
<b>Countries participating in IChO</b>	66	66	66	65	68	70	72	73	75	75	67
<b>Students participating in IChO</b>	254	256	257	250	267	273	283	291	291	290	264

## USNCO STATISTICAL INFORMATION

	2017	2018	2019	2020	2021	2022	2023				
<b>Local Exam Local Sections</b>	144	150	152	160 intended 110 organized	141	146	151				
<b>Natl. Exam Local Sections</b>	138	139	143	105	129	127	128				
<b>Natl. Exam Nominees</b>	982	1025	1017	778	861	738	898				
<b>Countries participating in IChO</b>	76	76	80	60	83	83	89				
<b>Students participating in IChO</b>	297	300	309	253	312	326	348				

## IChO PARTICIPATING TEAMS RESULTS 1984 - 2023

### 1984 – Frankfurt, West Germany – 16<sup>th</sup> IChO

<b>Name</b>	<b>School</b>	<b>Local Section</b>	<b>Medals</b>	<b>Ranking</b>
Seth Brown	Taylor Allderdice H.S., Pittsburgh, PA	Pittsburgh	Silver	13 (of 76)
Keith Rickert	The Latin School of Chicago, IL	Chicago	Bronze	37
Aaron DiAntonio	Clayton H.S., MO	St. Louis	Bronze	50
Peter Capofreddi	Newton High H.S., MA	Northeastern	D. R.*	

### 1985 – Bratislava, Czechoslovakia – 17<sup>th</sup> IChO

<b>Name</b>	<b>School</b>	<b>Local Section</b>	<b>Medals</b>	<b>Ranking</b>
Keith Rickert	The Latin School of Chicago, IL	Chicago	Silver	12 (of 83)
David Maymudes	University H.S., Los Angeles, CA	Southern California	Silver	25
Glen Whitney	Medfield H.S., MA	Northeastern	Bronze	44
Eric Kelson	Bountiful H.S., UT	Salt Lake City	Bronze	54

### 1986 – Leiden, Holland – 18<sup>th</sup> IChO

<b>Name</b>	<b>School</b>	<b>Local Section</b>	<b>Medals</b>	<b>Ranking</b>
Keith Rickert	The Latin School of Chicago, IL	Chicago	Gold	3 (of 86)
David Maymudes	University H.S., Los Angeles, CA	Southern California	Silver	20
Howard Lee	Lowell H.S., San Francisco, CA	California	Bronze	49
Hedy Edmonds	Greenwich H.S., CT	Western Connecticut	D. R.*	

### 1987 – Veszprem, Hungary – 19<sup>th</sup> IChO

<b>Name</b>	<b>School</b>	<b>Local Section</b>	<b>Medals</b>	<b>Ranking</b>
Anthony West	Kempsville H.S., Virginia Beach, VA	Hampton Roads	Silver	23 (of 103)
Cecil Huang	Pequannock Townsh. H.S., Pompton Pl., NJ	North Jersey	Silver	34
Jeffrey Snyder	Amherst Central H.S., NY	Western New York	Bronze	48
Kevin Crellin	Highland H.S., Salt Lake City, UT	Salt Lake City	D. R.*	

### 1988 – Helsinki, Finland – 20<sup>th</sup> IChO

<b>Name</b>	<b>School</b>	<b>Local Section</b>	<b>Medals</b>	<b>Ranking</b>
David Cliffl	Plainfield H.S., IL	Joliet	Silver (tie)	15 (of 104)
Laurance Lee	Lowell H.S., San Francisco, CA	California	Silver (tie)	15
Brian Kantsiper	Spring Valley H.S., Columbia, SC	South Carolina	Silver	26
Kurt Huang	New Terier H.S., Winnetka, IL	Chicago	Bronze	43

### 1989 – Halle, German Democratic Republic – 21<sup>st</sup> IChO

<b>Name</b>	<b>School</b>	<b>Local Section</b>	<b>Medals</b>	<b>Ranking</b>
Raphael Lehrer	Highland Park H.S., NJ	North Jersey	Bronze	40 (of 104)
Jon Kleinberg	Iroquois Central School, Elma, NY	Western New York	Bronze	42
Michael Furlanetto	Cherry Hill East H.S., PA	Philadelphia	Bronze	64
Roger Moore	Thompson Valley H.S., Loveland, CO	Colorado	D. R.*	69

\* D.R. Diploma of Recognition

## ICHO PARTICIPATING TEAMS RESULTS 1984 - 2023

### 1990 – Paris, France – 22<sup>nd</sup> IChO

Name	School	Local Section	Medals	Ranking
Wayne Whitney	Medfield H.S., MA	Northeastern	Gold	6 (of 111)
Marc Dionne	La Jolla H.S., CA	San Diego	Silver	30
Roger Moore	Thompson Valley H.S., Loveland, CO	Colorado	Silver	31
Steve Gubser	Cherry Creek H.S., Greenwood Village, CO	Colorado	Silver	32

### 1991 – Lodz, Poland – 23<sup>rd</sup> IChO

Name	School	Local Section	Medals	Ranking
Forrest Michael	Naperville Central H.S., IL	Chicago	Gold	12 (of 118)
Dean Chung	Mountain Lakes H.S., NJ	North Jersey	Silver	26
Ashley Reiter	NC School of Sci.& Math, Durham, NC	North Carolina	Bronze	39
Susan Kuhn	Girls Preparatory School, Chattanooga, TN	Chattanooga	Bronze	41

### 1992 – Washington, DC/Pittsburgh, PA, USA – 24<sup>th</sup> IChO

Name	School	Local Section	Medals	Ranking
Swaine Chen	O'Fallon Township H.S., IL	St. Louis	Gold	15 (of 131)
Logan McCarty	Amherst Central H.S., NY	Western New York	Silver	21
Jeffrey Chuang	Bellaire H.S., TX	Southeastern Texas	Silver	35
Christopher Herzog	Highland Park H.S., NJ	North Jersey	Bronze	44

### 1993 – Perugia, Italy – 25<sup>th</sup> IChO

Name	School	Local Section	Medals	Ranking
Chris Herzog	Highland Park H.S., NJ	North Jersey	Gold	5 (of 149)
Daniel Katz	Torrey Pines H.S., San Diego, CA	San Diego	Gold	14
David Hutz	Fox Chapel H.S., Pittsburgh, PA	Pittsburgh	Silver	27
Robert West	Oak Park H.S., Kansas City, MO	Kansas City	Silver	49

### 1994 – Oslo, Norway – 26<sup>th</sup> IChO

Name	School	Local Section	Medals	Ranking
Jessen Yu	T. Jefferson H.S. for S&T, Alexandria, VA	Washington, DC	Gold	12 (of 156)
Justin McCarty	Amherst Central H.S., NY	Western New York	Gold	19
Nicholas Loehr	Midlothian H.S., VA	Virginia	Silver	47
James Grimmelman	Horace Mann H.S., Riverdale, NY	New York	Bronze	59

### 1995 – Beijing, China – 27<sup>th</sup> IChO

Name	School	Local Section	Medals	Ranking
Jason Wong	T. Jefferson H.S. for S&T, Alexandria, VA	Washington, DC	Silver	43 (of 163)
Prashant Mishra	Detroit Country Day S., Beverly Hills, MI	Detroit	Silver	56
Elliot Waingold	Central York H.S., PA	Southeastern PA	Bronze	79
Michael Sawka, Jr.	Gunn H.S., Palo Alto, CA	Santa Clara Valley	Bronze	106

## IChO PARTICIPATING TEAMS RESULTS 1984 - 2023

### 1996 – Moscow, Russia – 28<sup>th</sup> IChO

Name	School	Local Section	Medals	Ranking
Henry Fu	Brecksville-Broadview Hts. H.S., OH	Cleveland	Gold	8 (of 170)
Alex MeVay	Groton School, MA	Northeastern	Silver	39
Michael Sawka, Jr.	Gunn H.S., Palo Alto, CA	Santa Clara Valley	Silver	45
Jason Chen	Claremont H.S., CA	San Gorgonio	Bronze	63

### 1997 – Montreal, Canada – 29<sup>th</sup> IChO

Name	School	Local Section	Medals	Ranking
Jason Chen	Claremont H.S., CA	San Gorgonio	Gold	2 (of 184)
Jordan Krall	Harvard-Westlake S., N. Hollywood, CA	Southern California	Silver	38
Andrew Heckerling	Niles West H.S., Skokie, IL	Chicago	Silver	51
Ian Baker	The McCallie School, Chattanooga, TN	Chattanooga	Bronze	112

### 1998 – Melbourne, Australia – 30<sup>th</sup> IChO

Name	School	Local Section	Medals	Ranking
Thomas Snyder	Amherst Central H.S., NY	Western New York	Gold	2 (of 185)
Ian Baker	The McCallie School, Chattanooga, TN	Chattanooga	Gold	6
Alexander Ioannidis	Bel Air H.S., MD	Maryland	Silver	30
Wei Ho	New Berlin West H.S., WI	Milwaukee	Bronze	86

### 1999 – Bangkok, Thailand – 31<sup>st</sup> IChO

Name	School	Local Section	Medals	Ranking
Timothy Jones	NC School of Sci.& Math, Durham, NC	North Carolina	Top Gold	1 (of 196)
Alexander Ho	Niles West H.S., Skokie, IL	Chicago	Gold	9
Wei Ho	New Berlin West H.S., WI	Milwaukee	Gold	20
Lisa Carlivati	T.Jefferson H.S. for S&T, Alexandria, VA	Washington, DC	Silver	36

### 2000 – Copenhagen, Denmark – 32<sup>nd</sup> IChO

Name	School	Local Section	Medals	Ranking
David Kurtz	Skyline H.S., Idaho Falls, ID	Idaho	Top Gold	1 (of 216)
Charles Duan	Beverly Hills H.S., CA	Southern California	Gold	13
Luke McSpadden	OK School for Science & Math, Tulsa, OK	Oklahoma	Bronze	69
Albert Wang	Bellaire H.S., TX	Greater Houston	Bronze	74

### 2001 – Mumbai, India – 33<sup>rd</sup> IChO

Name	School	Local Section	Medals	Ranking
Sean Kedrowski	Baylor H.S., Chattanooga, TN	Chattanooga	Gold	7 (of 210)
Binghai Ling	Brighton H.S., Rochester, NY	Rochester	Gold	15
Albert Wang	Bellaire H.S., TX	Greater Houston	Silver	25
Collin Martin	OK School for Science & Math, Tulsa, OK	Oklahoma	Silver	27

## IChO PARTICIPATING TEAMS RESULTS 1984 - 2023

### 2002 – Groningen, The Netherlands – 34<sup>th</sup> IChO

Name	School	Local Section	Medals	Ranking
Helen Shi	OK School for Science & Math, Tulsa, OK	Oklahoma	Gold	21 (of 225)
Daniel Cissell	Walnut Hill H.S., Cincinnati, OH	Cincinnati	Gold	25
Colin Whittaker	Wayland H.S., MA	Northeastern	Silver	36
Timothy Davenport	OK School for Science & Math, Tulsa, OK	Oklahoma	Bronze	90

### 2003 – Athens, Greece – 35<sup>th</sup> IChO

Name	School	Local Section	Medals	Ranking
Wei-Han Bobby Liu	Cookeville H.S., TN	Nashville	Silver	80 (of 233)
Eric Brown	The McCallie School, Chattanooga, TN	Chattanooga	Bronze	98
Frances Hocutt	Redondo Union H.S., Redondo Beach, CA	Southern California	Bronze	104
Benjamin Kaduk	Naperville North H.S., IL	Chicago	Bronze	100

### 2004 – Kiel, Germany – 36<sup>th</sup> IChO

Name	School	Local Section	Medals	Ranking
Eric Brown	The McCallie School, Chattanooga, TN	Chattanooga	Silver	56 (of 234)
John L. Kiappes Jr.	Memorial H.S., Houston, TX	Greater Houston	Silver	78
Emily Tsui	Montgomery Blair H.S., Silver Spring, MD	Washington, DC	Silver	66
Fan Zhang	Bergen County Academies, NJ	North Jersey	Silver	75

### 2005 – Taipei, Taiwan – 37<sup>th</sup> IChO

Name	School	Local Section	Medals	Ranking
Jacob Sanders	Acad. for the Adv. of S&T, Hackensack, NJ	North Jersey	Silver	48 (of 225)
Nicholas Sofroniew	Harvard-Westlake S., N. Hollywood, CA	Southern California	Silver	64
Allen Cheng	Arcadia H.S., CA	Southern California	Silver	72
Scott Rabin	Miami Palmetto H.S., FL	South Florida	Bronze	109

### 2006 – Gyeongsan, Republic of Korea – 38<sup>th</sup> IChO

Name	School	Local Section	Medals	Ranking
Michael Blaisse	Bishop McDevitt H.S., PA	Southeastern PA	Silver	55 (of 254)
Gregory Brockman	Red River H.S., ND	Red River Valley	Silver	65
Andrew Freddo	Manalapan H.S., NJ	Monmouth County	Silver	77
Alexander Zozula	East Brunswick H.S., NJ	North Jersey	Bronze	94

### 2007 – Moscow, Russia – 39<sup>th</sup> IChO

Name	School	Local Section	Medals	Ranking
Brian Lee	Aca. for the Adv. of S&T, Hackensack, NJ	North Jersey	Silver	40 (of 256)
Justin Koh	Stockdale H.S., CA	Southern California	Silver	43
Kenneth Brewer	Timpview H.S., UT	Central Utah	Silver	65
Sofia Izmailov	W. Windsor-Plainsboro H.S. South, NJ	Trenton	Bronze	152



## ICHO PARTICIPATING TEAMS RESULTS 1984 - 2023

### 2008 – Budapest, Hungary – 40<sup>th</sup> IChO

Name	School	Local Section	Medals	Ranking
Jonathan Lee	Harvard-Westlake H.S., N. Hollywood, CA	Southern California	Silver	70 (of 257)
Yuxin Xie	East Brunswick H.S., NJ	North Jersey	Bronze	89
Jenny Lu	Pomperaug H.S., Southbury, CT	New Haven	Bronze	132
Andrew Liu	Parkway Central H.S., Chesterfield, MO	St. Louis	Bronze	137

### 2009 – Cambridge, England – 41<sup>st</sup> IChO

Name	School	Local Section	Medals	Ranking
Yixiao Wang	Westfield H.S., NJ	North Jersey	Gold	25 (of 250)
Nathan Benjamin	W. H. Harrison H.S., West Lafayette, IN	Purdue	Silver	34
Brian Seifried	Chamblee H.S., GA	Georgia	Silver	37
Colin Lu	Vestal H.S., NY	Binghamton	Silver	59

### 2010 – Tokyo, Japan – 42<sup>nd</sup> IChO

Name	School	Local Section	Medals	Ranking
Colin Lu	Vestal H.S., NY	Binghamton	Gold	21 (of 267)
Alex Siegenfeld	Hopkins School, CT	New Haven	Gold	22
Richard Li	River Hill H.S., MD	Maryland	Silver	52
Utsarga Sikder	S. Brunswick H.S., NJ	North Jersey	Bronze	94

### 2011 – Ankara, Turkey – 43<sup>rd</sup> IChO

Name	School	Local Section	Medals	Ranking
Konstantin Borisov	North Allegheny H.S., PA	Pittsburgh	Gold	9 (of 273)
Joe Tung	Gretchen Whitney H.S., CA	Southern California	Gold	24
Elmer Tan	John P. Stevens H.S., NJ	North Jersey	Silver	48
Tayyab Shah	Vestal H.S., NY	Binghamton	Silver	80

### 2012 – Washington, D.C. – 44<sup>th</sup> IChO

Name	School	Local Section	Medals	Ranking
Chris Hillenbrand	Regis H.S., NY	New York	Gold	16 (of 283)
Sidhart Chand	Detroit Country Day School, MI	Detroit	Silver	64
James Deng	Choate Rosemary Hall, CT	New Haven	Silver	70
Jason Ge	Westview H.S., CA	San Diego	Silver	80

### 2013 – Moscow, Russia – 45<sup>th</sup> IChO

Name	School	Local Section	Medals	Ranking
David Liang	Carmel H.S., IN	Indiana	Gold	21 (of 291)
Runpeng Liu	Ladue Horton Watkins H.S., MO	St. Louis	Gold	26
Stephen Ting	Monta Vista H.S., CA	Santa Clara Valley	Silver	36
Saaket Agrawal	Mira Loma H.S., CA	Sacramento	Silver	47

## ICHO PARTICIPATING TEAMS RESULTS 1984 - 2023

### 2014 – Hanoi, Vietnam – 46<sup>th</sup> IChO

Name	School	Local Section	Medals	Ranking
Robert Kao	Edwin O. Smith High School, CT	Connecticut Valley	Gold	28 (of 291)
Derek Wang	North Allegheny Senior High School, PA	Pittsburgh	Silver	41
Stephen Li	Troy High School, MI	Detroit	Silver	44
Andrew Chen	W. Windsor-Plainsboro H.S. South, NJ	Trenton	Silver	50

### 2015 – Baku, Azerbaijan – 47<sup>th</sup> IChO

Name	School	Local Section	Medals	Ranking
David Wang	Monta Vista High School, Cupertino, CA	Santa Clara Valley	Gold	7 (of 290)
Janice Ong	T. Jefferson H.S. for S&T, Alexandria, VA	Washington, DC	Silver	76
Bryce Cai	Barrington High School, IL	Chicago	Silver	82
Soorajmath Boominathan	OK School of Sci. and Math., OK	Oklahoma	Silver	83

### 2016 – Tbilisi, Georgia – 48<sup>th</sup> IChO

Name	School	Local Section	Medals	Ranking
Alex Liu	The Village School, Houston, TX	Greater Houston	Gold	8 (of 264)
Kevin Tang	Solon High School, OH	Cleveland	Silver	44
Joyce Tian	T. Jefferson H.S. for S&T, Alexandria, VA	Washington, DC	Silver	66
Zilu Pan	Canyon Crest Academy, San Diego, CA	San Diego	Bronze	102

### 2017 – Nakhon Pathom, Thailand – 49<sup>th</sup> IChO

Name	School	Local Section	Medals	Ranking
Harrison Wang	Hinsdale Central High School, IL	Chicago	Gold	5 (of 297)
Joshua Park	Lexington High School, MA	Northeastern	Gold	16
Steven Liu	Monta Vista High School, CA	Santa Clara Valley	Gold	28
Brendan Yap	Carmel High School, IN	Indiana	Gold	32

### 2018 – Bratislava, Slovakia, Prague, Czech Republic – 50<sup>th</sup> IChO

Name	School	Local Section	Medals	Ranking
Jeffrey Shi	Marcellus High School, NY	New York	Gold	4 (of 300)
Michelle Lu	Pomperaug High School, CT	New Haven	Gold	10
Andrew Wu	Park Tudor School, IN	Indiana	Gold	12
Yutong Dai	Princeton International School for M&S, NY	Princeton	Gold	13

### 2019 – Paris, France – 51<sup>st</sup> IChO

Name	School	Local Section	Medals	Ranking
Yajvan Ravan	Churchill High School, MI	Detroit	Gold	19 (of 309)
Anton Ni	University High School, CA	Orange County	Gold	28
Edward Jin	Arnold O. Beckman High School, CA	Orange County	Gold	30
Albert Liu	North Hollywood High School, CA	Southern California	Silver	59

## ICHO PARTICIPATING TEAMS RESULTS 1984 - 2023

### 2020 – Virtual, Istanbul, Turkey – 52<sup>nd</sup> IChO

Name	School	Local Section	Medals	Ranking
Alex Li	Lexington High School, MA	Northeastern	Top Gold	1 (of 235)
Alec Zhu	Lexington High School, MA	Northeastern	Gold	8
Ananthan Sadagopan	Westborough High School, MA	Central Massachusetts	Gold	12
Anugrah Chemparathy	Dougherty Valley High School, CA	California	Gold	24

### 2021 – Virtual, Osaka, Japan – 53<sup>rd</sup> IChO

Name	School	Local Section	Medals	Ranking
Quyiang Zhou	Princeton International School for M&S, NY	Princeton	Gold	13 (of 309)
Yitian Zhou	Seven Lakes High School, TX	Greater Houston	Gold	27
Nikhil Seshadri	University City High School, CA	San Diego	Silver	42
Kien Phuong	Landon School, MD	Washington, DC	Silver	73

### 2022 – Virtual, Tianjin, China – 54<sup>th</sup> IChO

Name	School	Local Section	Medals	Ranking
Nathan Yihe				
Ouyang	University High School, CA	Orange County	Gold	6 (of 323)
Jack Liu	Carmel High School, IN	Indiana	Silver	37
Phoenix Wu	Seven Lakes High School, TX	Greater Houston	Silver	60
Gideon Tzafiri	Lexington High School, MA	Northeastern	Silver	94

### 2023 – Zurich, Switzerland – 55<sup>th</sup> IChO

Name	School	Local Section	Medals	Ranking
Anurag Sodhi	Centennial High School, CA	Maryland	Gold	18 (of 348)
Phoenix Wu	Seven Lakes High School, TX	Greater Houston	Gold	19
Alice Liu	Marquette High School, MO	St. Louis	Silver	61
Mingwen Duan	East Lyme High School, CT	Connecticut Valley	Silver	69

## 55<sup>th</sup> International Chemistry Olympiad, Switzerland

### Team USA Members Essays



*Team USA at the opening ceremony of the 55<sup>th</sup> IChO. Photo by IChO*

#### **Migwen Duan**

With 2023, we have finally exited the age of tests taken at home and Zoom events - and what better place to make this new beginning than Switzerland?

On our trip, we were presented not only with stunning views and delicious chocolate, but also the fellowship of like-minded peers and a medley of different cultures - something which, despite the coordinators' best efforts, would have been impossible through a computer screen.

Chemistry is a hands-on field - one where you directly view and analyze your objects of study - and this is no less true for colorful solutions than it is for the people we interact with. I'll never forget the vista of Mount Rigi, yet more important were those we laughed and shared our joy with: be they from Ukraine, Costa Rica, or China.

When we arrived in Zurich, we were presented with a kind of culture shock as foreigners in a different continent. Yet most of this came in the form of awe: the beauty of Zurich's waterways, the cleanliness of the city's roads and transportation, and the stunning prowess of the old architecture - things completely

unimaginable in the United States. I think that not only us, but also the other teams, were impressed with the quality of facilities provided by Switzerland and the IChO committee.

We embarked on several adventures throughout the city of Zurich with our wonderful guide, Johnmark, and the other teams attending. Being previously starved of human contact, the US team was eager to share fun games and aspects of our culture with the other teams, including our proud display of the team mascot, Testudo, and the team Texan, Phoenix. The ACS lab moles that we brought proved to be a hit among both students and guides, attracting hordes of people desperate to get their hands on a little stuffed critter.

Finally, it came time to take on the daunting, arduous tasks of the practical and theoretical exams. The problems of this year's tests were unprecedented in not only their difficulty and length, but in their quality and creativity as well. The practical exam featured not one, but two organic syntheses using a unique choice of reagent (bleach!), as well as a challenging qualitative analysis with a creative problem statement. On the theoretical exam, I enjoyed the challenging logical puzzle presented by the kinetics problem and the rigorous mathematics of the nanoparticle problem. I can only offer my most profuse thanks to the members of the steering committee for choosing to reduce the theoretical length from twelve problems to ten. It is my hope that this year's amazing problems will set a precedent for the quality of future IChO exams.

The weekend after exams, we were exposed to even more amazing parts of Switzerland. Highlights included the discovery of Valais fountain water from the mountains, and the unbelievably stunning 360 degree view from the peak of Mount Rigi. Lecturers also gave us insights into the workings of the chemical industry, which were incredibly illuminating.



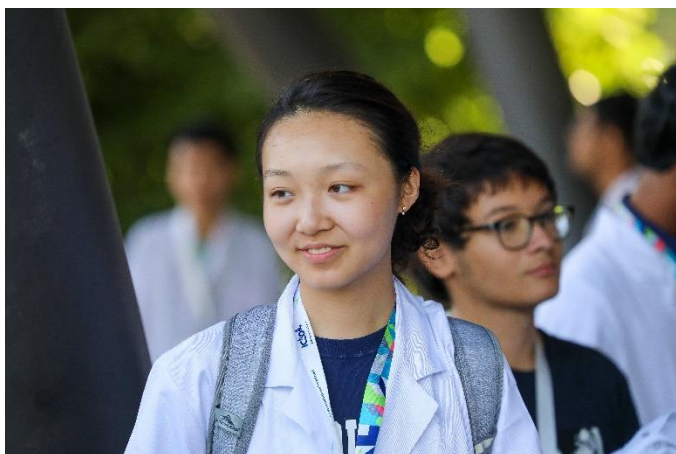
*Team USA with other IChO students. Photo by Anurag Sodhi*

Yet with every day we saw new sights, we were also faced with the knowledge that we would soon have to return home. The day before we left, every student enjoyed the farewell dance together, reinforcing the bonds formed throughout the entire experience. Many of us exchanged contact information, leaving me confident that the joy of IChO will not be forgotten, even after it has ended. We continue to message each other now, weeks after the closing ceremony.

Throughout high school, chemistry olympiad has been a focal part of my life. Having come from a naive student struggling through his first

textbook, to a young camper awed by the knowledge of the students around him, to becoming one of those knowledgeable students, has culminated in the experience we had in Switzerland. Yet I know that in the world of chemistry, I still have quite a ways to go. In a way, this experience marked a graduation from my days of high school exams and a transition towards becoming a contributing scientist as an adult. I have no doubt that this is also the case for the hundreds of students who participated along with us. Our paths will inevitably cross in the future as we work towards finding solutions together.

Finally, I would like to thank all those who made this terrific event possible: all of the wonderful volunteers who took time out of their schedules, and the IChO committees that organized the activities, wrote the problems, and prepared the labs. Thank you to ETH for graciously hosting us. And for those back home, I would like to thank the mentors who supported us, Mrs. Hines, Dr. Houck, Dr. Serbulea, and Dr. Xie, who worked hard on proofreading the exam for us and arbitrating our scores. Thank you as well to Dr. Raines and Ms. Thatcher for supporting us on the ACS side of things, and the University of Maryland for hosting the study camp that gave us the chance to go to Switzerland in the first place. And last but not least, I would like to thank my parents, who supported me through every step on my journey through chemistry, and who I love with all my heart.



*Alice Liu before the Laboratory Exam. Photo by IChO*  
utterly unforgettable.

### **Alice Liu**

Sifting through photos of my IChO 2023 experience feels a bit like an excavation. The dusty relics, hidden behind a cage of pixels and glass, unearthed memories and experiences, excitement and exhilaration. But unlike the origins of ancient artifacts, the moments that produced these photos still feel tangible. Frolicking in a rose garden in Bern, licking Swiss chocolate off my fingers in Visp, and watching the sunset from ETH Zurich's terrace - everything is vibrant and immediate. Simply put, IChO 2023 has been

ICHO officially commenced with the opening ceremony. The dozens of countries represented at ICHO packed themselves into a hall. Over the following hour, we marveled at the spectacle of speeches, demonstrations, and even snake dancing. One portion of the ceremony was dedicated to providing introductions to all the delegations. A drawing and animation would play for each country, and we would all cheer and wave our flags. We all remember the pent-up excitement and nervous energy circling the hall in these initial moments. But none of us could anticipate what would await us in the coming days.

For one, our time touring Switzerland was one of the most magical experiences of my life. Zurich itself was extraordinary. The passes we received from the ICHO organizers allowed us to take full advantage of the tram and rail systems. These were incredibly efficient and ran smoothly across the entire city and country. The cities themselves were also extremely walkable, with wide streets for pedestrians. One of the things I will miss the most, however, is the public fountains. In addition to being decorative, fountain water is drinkable and delicious in Switzerland. These fountains, a frequent sight in Zurich, allowed us to refill our water bottles periodically. In fact, the only thing I found more often than fountains during my trip was the urge to capture Switzerland's beautiful sights. The quaint buildings and river in Zurich's old town, the vast expanse of mountaintops near Mount Rigi, and the brilliant Lake Lucerne produced postcard views around every corner. Everything, from the streets to the lakes, was pristine.

The people I met were also incredible. There were almost 90 countries represented, each sending a team

of 4 students, so the event was incredibly diverse and interconnected. For instance, my roommate was from Ukraine. Throughout the event, I was also able to exchange gifts and talk to those from all over the world. Some of my favorite memories included learning card games from other countries, bonding over a shared love for Taylor Swift, and attempting to converse in French. Of course, however, nothing beat the friendly mascot and flag-stealing competition. Each delegation was originally provided with 4 of its country's flags. But some flags started to mysteriously disappear, ending up in the hands of other countries' delegations. Soon, everyone joined in on the fun, snatching flags out of drawstring bags and creating complicated contraptions to prevent others from accessing their hoard.

In addition to the wonderful people I met from around the globe, I could not think of better people with whom to spend my ICHO experience than my teammates Phoenix, Anurag, and Mingwen, and our team guide Johnmark. I will always cherish the hilarious antics we got into while in Switzerland, from playing late-night Codenames rounds to foiling a mascot heist attempt. Johnmark and my teammates' endlessly positive and supportive nature uplifted us all during the competition. Even prior to the event, the time that we four members of Team USA spent studying together helped us learn not only more about chemistry but also more about each other. Each of us shared a passion for chemistry that I found inspiring. Their support was also a huge help in tackling the theoretical and practical exams.

On this topic, the examinations themselves were in all ways exemplary. The creativity and ingenuity that the ICHO scientific committee put into the questions made for a challenging yet incredibly rewarding experience. In one of the questions, we had to piece together 5 separate pieces of data about enzyme kinetics to fill out a table of rate and equilibrium information. Figuring out how to do so was certainly frustrating. However, the problems brought a new and entirely welcome approach to traditional chemistry competitions, pushing us past our typical bounds of imagination and problem-solving. A similar thing could be said about the practical examination. The qualitative analysis question, where we had to figure out the content of 6 different solutions only by mixing them, also required creative thinking and problem-solving. In total, the problems left a lasting impression on me and opened my mind to chemistry's sweeping possibilities.

I extend my gratitude to ETH Zurich for hosting the competition. ETH Zurich's campuses were expansive and contained state-of-the-art equipment and laboratory space. I had a wonderful experience touring the university with our guides - visiting the legendary Polyterrasse, viewing the historic chemistry laboratories, and attending the Finding Solutions fair were some of the highlights.

I also would like to give my heartfelt thanks to the American Chemical Society for sponsoring this entire experience. The generosity of the ACS in coordinating flights, accommodation, etc., and in organizing the team selection camp is truly unmatched. In particular, Dr. Lily Raines and Ms. Malgorzata Thatcher have spent so much time and effort behind the scenes to make the entire US National Chemistry Olympiad program a success. In addition, I thank our dynamic team of mentors: Mrs. Esther Hines, Dr. Joseph Houck, Dr. Laura Serbulea, and Dr. Songwen Xie. Their chemistry knowledge and experience were instrumental to Team USA's success. During the event itself, they played a pivotal role in reviewing questions and arbitrating for points.

I am also incredibly grateful for my high school chemistry teacher Mr. Ed Bolton and my school's USNCO coordinator Dr. Cathy Farrar. Mr. Bolton's enthusiasm for chemistry has no doubt propelled

my USNCO journey. Dr. Farrar's never ending drive to help her students reach their goals inspires me every day to learn and discover more. Dr. Jianping Huang, my chemistry mentor, has taught me so much about not only chemical principles but also about problem solving and perseverance.

Finally, I give my thanks to my friends and family. My friends have been some of my biggest supporters and cheerleaders. Some of these people have been cheering me on for a decade. Others I first met during the USNCO study camp, where we forged friendships over chemistry, sharing resources and advice along the way. My parents, Ping and Fenglong, have been the bedrock of my USNCO journey, supporting me in every step of the process. My brother, Lawrence, is the person to whom I owe much of my success, as he was the one who initially introduced me to chemistry. I cannot thank my family enough for their generosity, kindness, patience, and humor over the years. Our nightly calls after the exams at IChO felt like warm hugs sent from overseas. I even documented much of my trip in photos to send to my family, since I do not have the thousands of words I need to express my thanks.

Years from today, I will look back on these artifacts with fond recollections. Yet the truth of the matter is that I will not need them. The unparalleled experience of IChO 2023 will remain in my memories forever. I will never forget the hospitality and splendor of Switzerland or the connections and friendships I have made throughout my journey.

### **Anurag Sodhi**

I had expected the International Chemistry Olympiad to be full of excitement and surprises; after all, the first in-person IChO in four years had to have some special things planned, right? However, nothing truly prepared me for the whirlwind of emotion and spectacle I was to experience.

Landing in Zurich with Mingwen and Alice (Phoenix's flight had been delayed, a trend that unfortunately wouldn't end with his first set of flights), I felt excited but also a little uncertain. Aside from a trip to India before I could remember and a brief excursion on the Canada side of Niagara Falls, I



*Anurag Sodhi in Switzerland, Photo by Anurag Sodhi*

had never been to another country before.

However, my first day in Switzerland didn't feel particularly abnormal. After settling in and enjoying some delightful "alpine mac and cheese" I felt ready for the start of official events the next day.

The next day started with meeting the US team's Swiss guide for the next 10 days, Johnmark; we would soon discover that he was perhaps the most enthusiastic and entertaining guide we could have hoped for. That day, we also met many

delegations from other countries, with whom we exchanged souvenirs. We had brought with us hundreds of ACS Moles, which would become something of a collector's item for the other countries over the next few days. Over the next week, we learned tons about chemistry in both industry and academia. Whether it was sustainable perfume production, new and improved insulation materials, robotic titration machines, or even mind-controlled racing games, we were constantly engaged with the



frontier in both chemistry and science as a whole.

Our explorations of chemistry were punctuated with excursions into the scenery of Switzerland, a country that I can now confidently say is one of the most beautiful in the world. Everything from the lakeside views to the beautiful mountains in the distance was a spectacle for the eyes. However, perhaps the most striking facet of Switzerland was the water. Yes, the water that came out of taps, faucets, and even decorative fountains tasted fantastic. Indeed, our guide informed us that the Swiss pride themselves on their stellar infrastructure, whether it be the immaculate plumbing or the hyper-efficient trams and trains running through the city of Zurich, and it certainly showed.

Unfortunately, we couldn't stay tourists forever, and eventually the days of the exams came. The laboratory practical exam, which tested our skills in organic synthesis, complexometric titration, and qualitative analysis, was very challenging yet educational at the same time. The theoretical exam, which explored topics in radiochemistry, electrochemical CO<sub>2</sub> reduction, enzyme kinetics, and complex inorganic and organic systems (including the beloved Nazarov cyclization), had some of the most fascinating and fun problems to solve. Although both exams were five hours each, it still managed to come down to the wire for me on both tests to answer everything. Afterwards, I didn't know what to expect for results; we would have to wait for three more days until they were announced.

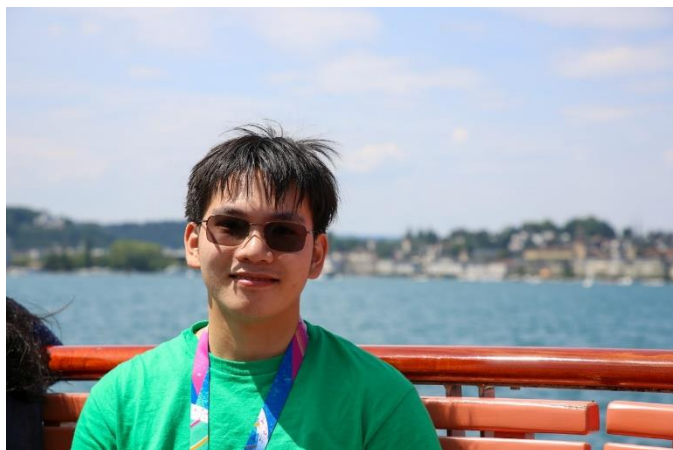
Luckily, those three days were filled with even more sightseeing and fun throughout Switzerland, including Bern, Lucerne, and Mount Rigi, which had some of the most beautiful views I have ever seen. We went to see the Lonza chemical plant in Visp and learned about both the chemistry and engineering behind the industrial production of biologics and small molecules. We also had a lot of Swiss chocolate during those three days which truly did, in fact, taste just as good as the hype made it out to be.

However, perhaps the most enjoyable part of the whole experience was hanging out with the other participants. Whether it was playing new card games, exchanging souvenirs, or participating in the ever-present friendly stealing of flags and mascots from each other, spending time with each other was truly a blast. By the end of it all going into awards day, I felt the huge weight I had kept on my shoulders the entire time lightened a bit as I realized that the point of this whole trip wasn't to win a medal; rather, it was the experience of being around so many amazing and talented people that was the true value of IChO.

I want to thank ETH Zurich and all of the organizers, test-writers, and volunteers for running a spectacular event (with a special shoutout to our guide, Johnmark, who made the experience all the more enjoyable and memorable). I also want to thank the ACS for making the experience possible, Dr. Raines and Ms. Thatcher for managing and organizing the USNCO program and its activities, and our mentors Mrs. Hines, Dr. Houck, Dr. Serbulea, and Dr. Xie for their support, instruction, and encouragement all the way through camp and IChO.

To my fellow participants at camp: between the Barbie movies, trap saxophone, and skibidi toilet, our camp adventures could easily have been its own essay; I thank you for those wonderful camp memories. To my fellow US Team members Mingwen, Alice, and Phoenix: I wouldn't have picked any other group of students to travel, compete, and share laughs over scuffed games of Codenames or distorted YouTube

Jeopardy binge watches with. Thank you for being some of the most amazing, funny, and generous peers I have ever spent time with. Finally, I want to thank my teachers Mr. Astri & Dr. Huang, my local USNCO coordinator Mrs. Salazar, and my parents for their unconditional support in my journey over the past three years. Chemistry Olympiad has been one of the most transformative experiences of my life, and I am incredibly thankful for the opportunity to have competed.



*Phoenix Wu in Switzerland, Photo by Phoenix Wu*

### **Phoenix Wu**

Even before I left Houston, my 55th IChO experience was action-packed. After weeks of study session discord calls following our intensive study camp, I was eagerly waiting to meet my teammates and mentors again in Switzerland. Unfortunately, what followed was a day of running around IAH, waiting for delayed and rescheduled flights, until finally descending in Zurich. But upon arriving at the hotel, brimming with nervous anticipation, I knew the following week would be magical.

Switzerland was an incredible country to explore during our week at IChO, and the experience was simply unforgettable in great part due to our guide, Johnmark. Johnmark, a master's student at ETH, first led us on a tour around Zurich. Even on a simple walk, we were amazed by the scenery, the incredibly efficient and convenient public transit, and most of all, the numerous water fountains. I'll never forget how the four of us just stopped on the sidewalk, laughing incredulously (probably confusing Johnmark and the other locals) while taking turns drinking some of the best tap water in the world.

Each day felt like two or three as we were shuttled around by the efficient and intensive Swiss schedule, but I was thrilled to take it all in. From soaking our feet in Bern's emerald river and racing up a hill to "frolic" in the grass; from tasting the legendary Swiss chocolate (and buying several pounds from Migros to enjoy later); to pressing our noses against the train window, first breathless at the stunning landscape passing by and subsequently at the apparent cost of living on the mountainside; every moment was exciting, rich, and filled with fun. The hike down Mt. Rigi stands out, however, as my favorite singular experience. Surrounded by the Swiss Alps and enjoying the mountain breeze, we surprised Johnmark on his birthday with a squished chocolate cake that Mingwen had carried all afternoon - the perfect way to spend one of our last days in Switzerland.

Something mind-blowing about the 55th IChO was simply the fact that it was the first in-person IChO in four years. Despite the best efforts of the 54th IChO in creating online opportunities for delegations to interact, there's simply no replacement for the spontaneous, organic exchanges that happened as a side product of having 89 different delegations in 1 place: running into Costa Rican team while exploring the hotel patio and getting a crash course in Spanish, staying up way too late playing cards with my Ukrainian roommate, having an hour-long discussion about college with the Canadian guide who I happened to sit next to on the bus. Flags and mascots were also constantly being stolen, and we even had a hostage exchange for our mascot Testudo with the Australian team!

Of course, the focus of IChO was still the competition itself. The practical exam consisted of 5 hours of grueling lab work involving 2 organic syntheses, multiple titrations, and a complicated puzzle involving 6 solutions of unknown ions. I was initially overwhelmed by the massive stack of answer sheets and crates of reagents and glassware, but I trusted in my preparation and left the room exhausted, yet satisfied with the work I was able to turn in. The theoretical exam was also an arduous 5 hours, covering a variety of fascinating topics such as complex enzyme kinetics, properties of molybdenum sulfur nanoparticles, and a synthesis of capellene involving the Nazarov cyclization. It was probably one of the hardest IChOs in recent history, and I left the room with a weight lifted from my shoulders. These exams represented the culmination of everything I had worked towards for the last few years, and regardless of the outcome, I would be proud of the result. As the award ceremony concluded and the celebrations finally ended, I was reminded of all the amazing bonds that I had built over the last week with people from across the world. Nowhere else would I be able to learn about the rich cultures, lives, and dreams of such a diverse set of regions, from China to Moldova to Peru, all united under a common passion for chemistry.



*Team USA. Photo by Songwen Xie*

Above all, I want to express gratitude to my teammates for being such great friends throughout this whole process. To Anurag, notably the best gambler amongst us, it is incredible how multifaceted your talents are while still being such an active discord mod on the side. To Alice, our resident Jeopardy and spelling bee expert, your ability to find fellow swifties hidden amongst any crowd, and the skills that you showed during the final celebration were quite impressive. To Mingwen, who I've attended the study camp with since you were a freshman, it's been wonderful seeing you (and especially your sense of humor) mature over the years. Altogether, IChO wouldn't have been nearly as enjoyable without y'all and the shenanigans we got up to.

The late nights we spent playing codenames or cards, our constant competition of trying to snap pictures whenever one of us fell asleep during lecture, I'll never forget these moments. I can't wait to see what y'all accomplish during senior year, and hopefully, I'll see all of you in college as well!

Finally, I would like to emphasize the hard work that Mrs. Hines, Dr. Xie, Dr. Houck, Dr. Serbulea, Ms. Thatcher, Dr. Raines, Mr. Johnmark, ACS Staff, and UMD put in to make the study camp and IChO run as smoothly as it did. Thank you for wrangling 20 teenagers for 2 weeks, for planning all the wonderful activities, and for making the "friendly exercises" that tormented us in the moment but ultimately prepared us for the international stage. The dedication of all these people to chemistry and the USNCO program is unbelievable, and I am immensely appreciative of their support.

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ACS NEWS

# Students selected for 2023 Chemistry Olympiad Study Camp

by *Nina Notman, special to C&EN*

May 9, 2023

**T**he American Chemical Society's US National Chemistry Olympiad program has selected the 20 high school students that will attend the 2023 Chemistry Olympiad Study Camp. The camp will take place from June 4 to 17 at the University of Maryland, College Park.

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The students have already completed local and national Chemistry Olympiad exams. At the camp, they will be competing for a place on the four-member team representing the US at the 55th International Chemistry Olympiad, to be held July 16–25 in Zurich, Switzerland.

Representing 16 ACS local sections and 14 states, the students are: **Anantshri Asthana**, John Foster Dulles High School in Texas; **Luke Chen**, Blue Valley North High School in Kansas; **Nipun Dour**, Mira Loma High School in California; **Mingwen Duan**, East Lyme High School in Connecticut; **Canaan He**, Carmel High School in Indiana; **James Jiang**, F. W. Buchholz High School in Florida; **Sebastian Kumar**, Tesla STEM High School in Washington State; **Brian Li**, Acton-Boxborough Regional High School in Massachusetts; **Yiwei Liang**, Princeton International School of Mathematics and Science in New Jersey; **Yunyi Ling**, Montgomery Blair High School in Maryland; **Alice Liu**, Marquette High School in Missouri; **Arya Morasa**, Mira Loma High School in California; **Viraj Negandhi**, John Foster Dulles High School in Texas; **Yash Shah**, Panther Creek High School in North Carolina; **Anurag Sodhi**, Centennial High School in Maryland; **Ethan Song**, West Windsor-Plainsboro High School South in New Jersey; **Albert Tang**, The Westminster Schools in Georgia; **Aaron Wang**, Conestoga High School in Pennsylvania; **Phoenix Wu**, Seven Lakes High School in Texas; and **Annie Xu**, Mission San Jose High School in California.

Four mentors will support the students at the camp: **Esther Hines**, Billerica Memorial High School in Massachusetts; **Joseph Houck**, Pennsylvania State University; **Laura Serbulea**, University of Virginia; and **Songwen Xie**, Massachusetts College of Pharmacy and Health Sciences.

For more information, visit [www.acs.org/olympiad](http://www.acs.org/olympiad) and [www.icho2023.ch](http://www.icho2023.ch).

## CORRECTION:

This article was updated on May 9, 2023, to correct the byline. The article was written by Nina, not Niina, Notman.

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ACS NEWS

# 2023 International Chemistry Olympiad team revealed

by **Nina Notman**, special to C&EN

June 21, 2023



Credit: Sri Balasubramanian/ACS staff

Sebastian Kumar (from left), Mingwen Duan, Alice Liu, Anurag Sodhi, Phoenix Wu, and Brian Li will represent the US in the 2023 International Chemistry Olympiad.

**T**he team that will represent the US at the 55th International Chemistry Olympiad, to be held July 16–25 in Zurich, Switzerland, has been announced. The four high school students will compete against teams from around 90 countries.

The 2023 team consists of **Mingwen Duan** from East Lyme High School in Connecticut, **Alice Liu** from Marquette High School in Missouri, **Anurag Sodhi** from Centennial High School in Maryland, and **Phoenix Wu** from Seven Lakes High School in Texas. The first alternate is **Sebastian Kumar** from Tesla STEM High School in Washington State. The second alternate is **Brian Li** from Acton-Boxborough Regional High School in Massachusetts.

The team was chosen from the 20 students who participated in the **Chemistry Olympiad Study Camp**, which was held at the University of Maryland, College Park, June 4–17. The best thing about the camp for Sodhi was “meeting different people from across the country who are not only enthusiastic about chemistry but also about problem solving and doing challenging things.” Liu concurs, adding that “I also really enjoyed the lectures and laboratory activities. The experience has just been amazing from start to finish.”

In Zurich, the US students will compete in written and practical exams alongside students from other nations. Wu was also on the US team for the 2022 International Chemistry Olympiad, which was held online. “I am both excited and nervous about the practical portions [in this year’s competition] since that was missing in last year’s International Chemistry Olympiad,” he says.

The students will also have time for sightseeing, to explore Swiss science universities and institutes, to participate in panel discussions about careers and entrepreneurship in chemistry, and to get to know competitors from other nations. “It’ll be similar to camp in that the best part will be getting to meet the other people, except this time it is not from all around the country, it is from around the world,” says Duan.

“I think there is a great chance we will get four gold medals this year,” says Esther Hines, head team mentor from Billerica Memorial High School in Massachusetts. Three additional mentors will accompany the team to Zurich: Joseph Houck from Pennsylvania State University, Laura Serbulea from University of Virginia; and Songwen Xie from Massachusetts College of Pharmacy and Health Sciences.

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