

The MATHEMATICAL ASSOCIATION of AMERICA

1529 Eighteenth Street, N.W.

Washington, D.C. 20036

Telephone (202) 387-5200

March 29, 1995

Scientific Officer Code: 311

Dr. Andre van Tilborg

Office of Naval Research

800 North Quincy Street

Arlington, VA 22217-5660

YOUR REF: ONR Grant No. N00014-94-1-0383

To: Andre van Tilborg

From: Marcia P. Sward/mac

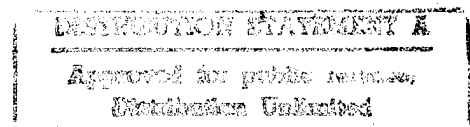
At the request of Dr. Marcia Sward, I am enclosing a copy of the performance report, i.e. "Proceedings" for ONR Grant N00014-94-1-0383. The report concerns activities of the 1995 MOSP (Mathematical Olympiad Summer Program) held at the Illinois Mathematics and Science Academy (IMSA) from June 13 to July 12, 1995.

Also enclosed are forms (SF 298) and (SF 269).

Maureen Callanan

Maureen Callanan

Development Assistant



CC with encs.:

Grant Administrator/Resident Representative N66020, Atlanta GA

(Attn: Charles K. Hayes)

DTIC/Alexandria, VA

THIS DOCUMENT WITH ATTACHMENTS ALSO FAXED TO CHARLES K. HAYES ON MARCH 29, 1996 AT (404) 730-9260.

REPORT DOCUMENTATION PAGE			Form Approved OMB No. 0704-0188	
Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.				
1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE 1995	3. REPORT TYPE AND DATES COVERED 01 FEB 1994 through 31 JAN 1996		
4. TITLE AND SUBTITLE Mathematical Olympiad Summer Program (MOSP) [2nd year of grant]		5. FUNDING NUMBERS N00014-94-1-0383 [2nd year of grant]		
6. AUTHOR(S) Dr. Titu Andreescu, Director of MOSP				
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) The Mathematical Association of America (MAA) 1529 Eighteenth Street, N.W. Washington, DC 20036		8. PERFORMING ORGANIZATION REPORT NUMBER 1995 MOSP		
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) Department of the NAVY, Office of Naval Research Arlington, VA 22217-5660		10. SPONSORING/MONITORING AGENCY REPORT NUMBER N00014-94-1-0383		
11. SUPPLEMENTARY NOTES				
12a. DISTRIBUTION/AVAILABILITY STATEMENT Available to public		12b. DISTRIBUTION CODE		
13. ABSTRACT (Maximum 200 words) Technical Objective: The objective is to prepare a team of U.S. high school students to compete in the International Mathematical Olympiad (IMO) held in Toronto, Canada, July 19-20, 1995. Those selected are introduced to a wide range of mathematical problems and theory at the Mathematical Olympiad Summer Program (MOSP) held for the first time in 1995 at the Illinois Mathematics and Science Academy (IMSA). The U.S. Team placed 11th among the 74 competing countries with team members earning 6 medals.				
14. SUBJECT TERMS		15. NUMBER OF PAGES		
		16. PRICE CODE		
17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT	

19960410 050

FINANCIAL STATUS REPORT

(Short Form)

(Follow instructions on the back)

1. Federal Agency and Organizational Element to Which Report is submitted Office of Naval Research		2. Federal Grant or Other Identifying Number Assigned By Federal agency N 00014-94-1-0383		OMB Approval No. 0348-0039	Page 1	of 1 pages
3. Recipient Organization (Name and complete address, including ZIP code) THE MATHEMATICAL ASSOCIATION OF AMERICA 1529 18th STREET NW WASHINGTON DC 20036						
4. Employer Identification Number 16-0743079		5. Recipient Account Number or Identifying Number 2212		6. Final Report ☒ Yes ☐ No		7. Basis ☒ Cash ☐ Accrual
8. Funding/Grant Period (See Instructions) From: (Month, Day, Year) 1-1-95		To: (Month, Day, Year) 12-31-95		9. Period Covered by this Report From: (Month, Day, Year) 1-1-95		To: (Month, Day, Year) 12-31-95
10. Transactions:				I Previously Reported	II This Period	III Cumulative
a. Total outlays				43,844	---	43,844
b. Recipient share of outlays				-	-	-
c. Federal share of outlays				43,844	---	43,844
d. Total unliquidated obligations				-	-	-
e. Recipient share of unliquidated obligations				-	-	-
f. Federal share of unliquidated obligations				-	-	-
g. Total Federal share (Sum of lines c and f)				-	-	43,844
h. Total Federal funds authorized for this funding period				-	-	43,844
i. Unobligated balance of Federal funds (Line h minus line g)				-	-	0
11. Indirect Expense						
a. Type of Rate (Place "X" in appropriate box) ☐ Provisional ☒ Predetermined ☐ Final ☐ Fixed						
b. Rate 33%		c. Base 35,000		d. Total Amount 8,844		e. Federal Share 8,844
12. Remarks: Attach any explanations deemed necessary or information required by Federal sponsoring agency in compliance with governing legislation.						
13. Certification: I certify to the best of my knowledge and belief that this report is correct and complete and that all outlays and unliquidated obligations are for the purposes set forth in the award documents.						
Typed or Printed Name and Title Marcia P. Sward, Executive Director				Telephone (Area code, number and extension) 202-387-5200		
Signature of Authorized Certifying Official <i>Marcia P. Sward</i>				Date Report Submitted 3/27/96		

The 1995 Mathematical Olympiad Summer Program Report

The 1995 Mathematical Olympiad Summer Program (MOSP) was held at the Illinois Mathematics and Science Academy (IMSA) from June, 13 to July, 12. It was the first time in 22 years that the program was hosted by an institution other than the Service Academies (The United States Military Academy in West Point, New York and the Naval Academy in Annapolis, Maryland). Located in Aurora, IMSA is the state's public residential high school for talented mathematics and science students in grades 10-12. IMSA also serves as an educational laboratory for developing and testing innovative programs to share with other school systems, teachers and students in Illinois and across the country.

The main goals of the Mathematical Olympiad Summer Program are:

1. To provide a quality mathematics program for 24-30 very promising students who have risen to the top on contests. It shall insure interest in mathematics, broaden students' view of mathematics and better prepare them for possible participation on our IMO team. The program shall also provide the best example of the way mathematics instruction should be carried out.

2. To identify from among the participants in each given summer a USA IMO team. To coach this team to its highest level of performance in the IMO, and to achieve an atmosphere of comradeship and cooperation among the team and other participants.

Twenty-four students were invited to participate in the 1995 MOSP (23 males and 1 female). Titu Andreescu was the Director of the program. Paul Zeitz and Elgin Johnston were the assistant directors. Kiran Kedlaya, Lenny Ng and Stephen Wang served as student assistants. Prof. Walter Mientka, the Executive Director of the American Mathematics Competitions, who accompanied the instructors and the six IMO team members on their trip from the Washington DC USAMO Ceremonies to Aurora, the MOSP site, spent a day at IMSA and gave the opening lecture, a very interesting and inspiring presentation of Morley's Theorem.

The instructional program was structured such that it addressed constantly at least two levels (introductory, advanced and, in its final part, the IMO team). The "official" lectures were given at 9, 11 and 1pm, Monday through Friday. In addition, assistant and student lectures were given at various hours, including weekends. Students took 13 MOSP and additionally (for the IMO team and other students who expressed interest) 5 IMO tests. They were further assigned and turned in 2 MOSP and 1 IMO weekly problem sets. Two team contests and a student mathematical marathon were also designed.

This very intense academic program was balanced by two long trips to Chicago

(Museum of Science and Industry, Lake front, Taste of Chicago) and State's Park (Starving Rock), three short ones: Geneva Park, Fox Valley Mall, Fox Valley Movie Theater (Pocahantas) and by various athletic activities such as the daily ultimate frisbee, the basketball and the ping-pong tournaments.

The program was visited by Dr. Marcia Sward, the Executive Director of the MAA and by Dr. Richard Gibbs, chair of the Committee on the American Mathematics Competitions. They inspected the facilities, both academic and residential and met with the students and the instructors in a two-hour very interesting and useful open discussion. Dr. Sward met with Dr. Stephanie Pace Marshall, IMSA's Executive Director. Dr. Gibbs gave an interesting lecture about the Square-cube property.

Dr. Don Coppersmith was, again, our invited lecturer this year, through a generous IBM grant. He talked about "Polynomials whose powers are sparse". His presentation was very well received by the entire audience.

Two visiting lecturers, Asuman Oktac and Xiaodi Wang gave 2 lectures each in the last academic day of the program.

Despite the fact that the USA 1995 IMO team did not repeat the 1994 IMO performance, it appeared evident that the 1995 MOSP was the most successful ever. We have a strong inclination that the outstanding MOSP '95 work will pay dividends in 1996 and the following years.

Titu Andreescu, Director, The Mathematical Olympiad Summer Program

AMERICAN MATHEMATICS COMPETITIONS

1995 MATHEMATICAL OLYMPIAD SUMMER PROGRAM

JUNE 13 - JULY 12, 1995

LIST OF PARTICIPANTS

Carl J. Bosley (913) 862-9956	6825 SW Windsong Drive	Topeka, KS 66619-1301
Christopher C. Chang (415) 494-6790	715 Charleston Ct.	Palo Alto, CA 94303
Li-Chung Chen (408) 253-5992	1194 Crestline Drive	Cupertino, CA 95014
Jay H. Chyung (319) 351-7437	13 Woodland Heights NE	Iowa City, IA 52240
John J. Clyde (208) 278-5678	PO Box 338	New Plymouth, ID 83655
Nathan G. Curtis (703) 709-9072	1255 Center Harbor Place	Reston, VA 22094
Jonathan K. Fisher (615) 647-6583	527 Idlewood Drive	Clarksville, TN 37043
Michael H. Freiman (215) 247-9033	7902 Lincoln Drive	Philadelphia, PA 19118
Andrei C. Gnepp (216) 464-3549	3968 East Ash Lane	Orange Village, OH 44122
Daniel B. Johnston (515) 232-8544	840 Brookridge Ave.	Ames, IA 50010
Stefan G. Kazachki (919) 876-8224	725 Purdue St.	Raleigh, NC 27609
Aleksandr L. Khazanov (718) 436-9537	679 Ocean Parkway #6A	Brooklyn, NY 11230
Travis J. Kopp (303) 979-6455	11219 W. Stanford Ave.	Littleton, CO 80127
Michael R. Korn (612) 490-1973	32 Bridgewater Drive	Vadnais Heights, MN 55127
Eric H. Kuo (412) 372-6622	208 Meadow Drive	Trafford, PA 15085
Jacob A. Lurie (301) 229-3059	6611 Braeburn Parkway	Bethesda, MD 20817
Davesh Maulik (516) 626-7957(8)	39 Hummingbird Dr.	East Hills, NY 11576
Josh P. Nichols-Barrer (617) 244-8421	24 Hazelton Rd.	Newton, MA 02159
Alexander H. Saltman (512) 451-1665	721 Park Blvd.	Austin, TX 78751

Daniel A. Stronger (718) 225-3445	63-12 252 St.	Little Neck, NY 11362
Aaron M. Ucko (816) 822-8052	1007 W. 66th St.	Kansas City, MO 64113-1815
Lauren K. Williams (310) 378-9615	1624 Cataluna Place	Palos Verdes Estates, CA 90274
Kevin M. Woods (404) 972-8228	3341 Rae Place	Lawrenceville, GA 30244
Donald J. Ying (408) 243-6221	4715 Malero Place	San Jose, CA 95129

STAFF

Director	Associate Director	Associate Director
Mr. Titu Andreescu Illinois Math & Sci Academy 1500 W Sullivan Rd Aurora, IL 60506 (708) 907-5964	Prof. Paul Zeitz Dept. of Mathematics Univ. of San Francisco San Francisco, CA 94117-1080 (415) 666-6590	Prof. Elgin Johnston Dept. of Mathematics Iowa State University Ames, IA 50011 (515) 294-7294
Student Assistant	Student Assistant	Student Assistant
Kiran Kedlaya 12912 Georgia Ave. Silver Spring, MD 20906 (301) 946-5604	Lenhard Ng 1107 Roosevelt Drive Chapel Hill, NC 27514 (919) 942-3931	Stephen S. Wang 4N804 Grandma's Lane St. Charles, IL 60175 (708) 377-0988

#

American Math Competitions
(402) 472-2257
Math Association of America
(202) 387-5200

Dr. Walter E. Mientka, Secretary
International Mathematical Olympiad Advisory Board
University of Nebraska
Lincoln, Nebraska 68588-0658
U.S.A.

eMail: walter@amc.unl.ed Bitnet: walter@unlamc FAX: 1- 402-472-6087 Tel: 1-402-472-5114

TUESDAY JUNE 13		WEDNESDAY JUNE 14	
		Level I	Level II
		W, T, P, E, L, S	Introduction
9			Morley's Theorem
11		T, L, S	Homework Discussion
2	ARRIVAL		
THURSDAY JUNE 15		FRIDAY JUNE 16	
		Level I	Level II
9	T, L, S Introduction to Writing Proofs	P Generating Functions II	E Generating Functions II
11	L, S Writing Proofs	T Telescoping Sums&Prod	P Combinatoric Arguments
2	P Generating Functions E Generating Functions	E Combinatoric Arguments	T Telescoping Sums&Prod
MONDAY JUNE 19		TUESDAY JUNE 20	
		Level I	Level II
9	P Combinatoric Identities	E Combinatoric Identities	P Theory of Equations
11	T Triangles	T Induction	E Transformations I
2	E Pigeonhole Principle	P Theory of Equations	T Induction
WEDNESDAY JUNE 21		THURSDAY JUNE 22	
		Level I	Level II
9	E Inclusion-Exclusion	P Graph Theory I	T Triangles
11	T Transformations II	E Conics	P Graph Theory I
2	P Congruence	T Plane Geometry	E Conics
FRIDAY JUNE 23		MONDAY JUNE 26	
		Level I	Level II
9	E Fixed Point Theorems	E Linear Algebra	P Additive Problems in NT
11	T Diophantine Equations	T Extremal Arguments	E Linear Algebra
2	P Graph Theory II	P Additive Problems in NT	T Extremal Arguments
TUESDAY JUNE 27		WEDNESDAY JUNE 28	
		Level I	Level II
9	P Combinatorial NT	T Inversive Geometry II	E Polynomials I
11	T Circles. Radical Axis	E Polynomials I	P Quadratic Reciprocity
2	E Inversive Geometry	P Quadratic Reciprocity	T Inversive Geometry II
THURSDAY JUNE 29		FRIDAY JUNE 30	
		Level I	Level II
9	P Algorithmic Proofs	K Pascal-Brianchon Thms	T Functional Equations
11	T Polynomials II	E Non-IMO Talk	K Pascal-Brianchon Thms
2	E Analytic Geometry	T Functional Equations	P Non-IMO Talk
MONDAY JULY 3		TUESDAY JULY 4	
		Level I	Level II
9	P Combinatorial Geometry	E Inequalities	P Probability
11	T Trigonometry I	P Combinatorial Geometry	E Vector Geometry
2	E Inequalities	T Trigonometry I	T Trig. and Applications

WEDNESDAY JULY 5		THURSDAY JULY 6	
Level I		Level I	
9	T Geometric Inequalities	E Complex Nos. in Geom.	T Recurrence Relations I
11	E Complex Nos in Geom.	P Ramsey's Theorems I	P Ramsey's Theorems II
2	P Ramsey's Theorems I	T Geometric Inequalities	E Approximations
FRIDAY JULY 7		MONDAY JULY 10	
Level I		Level I	
9	K Projective Geometry	T Recurrence Relations II	X Odd and Even Numbers
11	E Non-IMO Talk	K Projective Geometry	A Euclidean Constructions
2	T Recurrence Relations II	P Non-IMO Talk	X Odd and Even Numbers
TUESDAY JULY 11		WEDNESDAY JULY 12	
Level I		Level I	
9	X The Symmetry Method	A Invariants	
11	A Invariants	X The Symmetry Method	
2	STUDENT TALK		DEPARTURE

A Asuman(visitor)
 E Elgin(assoc. dir.)
 K Kiran(assistant)
 L Lenny(assistant)
 P Paul(assoc. dir.)
 S Stephen(assistant)
 T Titu(director)
 W Walter(exec. dir. AMC)
 X Xiaodi(visitor)

JOINT POLICY BOARD FOR MATHEMATICS

1529 EIGHTEENTH STREET NW • WASHINGTON, DC 20036 • 202/234-9570 • FAX 202/462-7877 • jpbm@math.umd.edu.

NEWS

FOR IMMEDIATE RELEASE

Mailed: July 25, 1995

Contact: Kathleen Holmay

301-942-9595

U.S. TEAM TAKES SIX MEDALS AT INTERNATIONAL MATH OLYMPIAD -Places 11th Among 74 Participating Countries-

(Washington, DC).....Each of the six members of the U.S. team won medals at the 36th International Mathematics Olympiad in Toronto, Canada on July 19 and 20. The U.S. team placed 11th among the record number of 74 countries that participated. The top 12 teams were China, Romania, Russia, Vietnam, Hungary, Bulgaria, South Korea, Iran, Japan, United Kingdom, U.S.A. and India.

Aleksandr L. Khazanov, Brooklyn, NY, Jacob A. Lurie, Bethesda, MD, and Josh P. Nichols-Barrer, Newton Center, MA won silver medals. Khazanov and Lurie were members of last year's U.S. IMO team which received a perfect score for the first time in IMO history.

Christopher C. Chang, Palo Alto, CA, Jay H. Chyung, Iowa City, IA, and Andrei C. Gnepp, Orange, OH, won bronze medals. The six U.S. winners received their medals at the IMO closing awards presentation on July 24.

U.S. team members were selected based on their performances in the twenty-fourth annual USA Mathematical Olympiad held in April of this year. The U.S. team had four weeks of intensive training at the Illinois Academy of Math and Science in Aurora, IL before traveling to Toronto.

(more)