



Georgia Institute of Technology

Director of Internal Auditing

AUDIT REPORT ON FINANCES OF THE SCHOOL OF MATHEMATICS AND THE CENTER FOR DYNAMICAL SYSTEMS AND NONLINEAR STUDIES

April 29, 1998

1. Introduction

On August 8, 1997, Dr. Theodore P. Hill, Professor in the School of Mathematics (SOM), filed a grievance against Dr. Shui-Nee Chow, Chair of the School of Mathematics. This grievance requested five actions:

- Action #1: Change in Annual Performance Evaluation.
- Action #2: Funding for Postdoctoral Associates.
- Action #3: Establishment of a Temporary Institute Committee to Evaluate SOM Salary Distributions and to Recommend Remedies.
- Action #4: Formal External Audit of SOM/CDSNS Finances since 1988.
- Action #5: Written and Public Apology for Violation of Confidentiality.

A Faculty Status and Grievance Committee conducted an informal investigation of Dr. Hill's grievance and issued a report on November 7, 1997. This report gave the decisions of the committee on all actions except Action #4. On this action, the conclusions of the committee were as follows:

We agree with Prof. Hill and the Chair Evaluation Committee that the vague relationship between CDSNS [Center for Dynamical Systems and Nonlinear Studies] and SOM [School of Mathematics] is a logical object of faculty speculation regarding issues of conflict of interest, diversion of funds, and inequitable distribution of SOM resources. We strongly support Prof. Hill's request for an audit of CDSNS and SOM finances since the establishment of CDSNS in 1988.

Department of Internal Auditing
Atlanta, Georgia 30332-0254 U.S.A.
PHONE 404-894-4606
FAX 404-894-6990

We believe, however, that such an audit can be adequately conducted by the Institute's internal auditors, provided explicit and specific direction is given to address the issues identified above.

In response to this recommendation, the Senior Vice President for Administration and Finance requested that the internal audit department conduct an investigation with respect to the financial issues raised in Action #4. He also requested that we confer with the Institute legal staff and investigate the status of Dr. Hill's request for various documents under the Open Records Act.

These were the concerns expressed in Action #4:

- That funds have been inappropriately diverted from SOM as a whole into the Center for Dynamical Systems and Nonlinear Studies.
- That the proportion of SOM funds spent in support of CDSNS is excessive.
- That there is a disproportionately large disbursement of funds for international travel and other expenses incurred by Dr. Chow.
- That there are additional issues regarding the use of funds in certain Georgia Tech Foundation accounts.
- That the vague relationship between CDSNS and SOM is a logical object of faculty speculation regarding issues of conflict of interest, diversion of funds, and inequitable distribution of SOM resources.

2. Background

a. School of Mathematics

The School of Mathematics is one of six degree-granting schools in the College of Sciences. The School offers a wide range of courses in the various engineering, science, and management disciplines; and it also offers programs leading to the bachelor's, master's, and doctoral degrees in mathematics. Specialized courses, many of them emphasizing areas related to the research activities of the faculty, include mathematical analysis, applied mathematics, differential equations, scientific computing, probability, and statistics. The proposed budget for FY 1998 showed an EFT of 75.65 and a budget of \$5,621,505.

A review of expenditure records for the School of Mathematics showed total disbursements of \$3,318,060 for FY 1988 and \$6,056,441 for FY 1997, an increase of \$2,738,381 for the 10-year period, or a percentage increase of 82.53%.

b. Center for Dynamical Systems and Nonlinear Studies

The Center was established at Georgia Tech in September 1988 to strengthen existing research activities in the School of Mathematics with special emphasis on dynamical systems, differential equations, nonlinear analysis, and applications. A good understanding of the contemplated organization and development of the Center may be gained from an Institute proposal prepared in January 1988. The proposal indicated that this Center was to be a unit of the School of Mathematics, consisting of:

- Director Shui-Nee Chow, currently Distinguished Professor of Mathematics at Michigan State University.
- Professor Jack Hale, currently Professor of Mathematics at Brown University.
- Certain faculty already in the School of Mathematics.
- Several additional faculty to be added over the next five years.
- Publication of the *Journal of Differential Equations* with Professor Hale as chief editor.
- Two full-time staff members.

It was stated in the proposal that both Dr. Chow and Dr. Hale had external grant funding and that this funding, along with significant external research funding provided by members of the School of Mathematics who would join the Center, would probably provide enough overhead to cover the costs of the Center.

A confirmation letter, on May 17, 1988, from the Dean of the College of Sciences and the Director of the School of Mathematics gave Professors Chow and Hale details on space, teaching assignments, and start-up funding of \$300,000. This funding was to be used at the discretion of the Director over a period of five years as leverage to generate external funds in support of his research programs and the research to be conducted by the Center. A significant statement in the letter

indicated that the Center was expected to generate \$300,000 in external funds per annum after two years.

3. Purpose and Scope

The purpose of our audit was to deal with the concerns expressed in Action #4: inappropriate diversion of funds from the School of Mathematics to the Center, excessive support of the Center with SOM funds, large travel expenses, and the use of Foundation funds. The Chair Review and Evaluation Committee in its report on March 25, 1997, stated that "Dr. Chow is devoting substantial SOM support to CDSNS in the form of part-time teaching for CDSNS post-doctoral staff, without consulting the Hiring Committee to ensure that such positions are spread uniformly throughout SOM." Since this particular diversion of funds has been previously recognized by the Committee, we have not included a discussion of it in our report. Nor have we included any discussion of SOM salaries since this matter was covered by the Faculty Status and Grievance Committee.

We examined such books and records as we thought necessary for our report and extensively interviewed appropriate personnel.

In a memorandum to the Georgia Tech Foundation, we requested information on all funds of the School of Mathematics from FY 1988 to the present. An officer of the Foundation provided schedules on contributions from January 1, 1991, through January 15, 1998, and on disbursements from July 1, 1994, through January 30, 1998. He explained that the Foundation did not have on-line access to the other records requested and that it would be a time-consuming and burdensome task to attempt a manual copying of those records. We determined that the purpose of our audit could be satisfactorily accomplished without the additional records and proceeded on that basis.

The travel records for the Georgia Tech Research Corporation covered Fiscal Year 1991 through June 30, 1996. At that time, the Research Corporation stopped its reimbursement of travel and started transferring funds to the schools through the budget process.

4. Findings

a. Center for Dynamical Systems and Non-Linear Studies

A review of the operations of the Center is necessary for a better understanding of the issues raised in Action #4 of the grievance and the relationship of the Center

to the School of Mathematics. The Center was established in September 1988, but separate Georgia Tech accounting records were not created until FY 1991. Our analysis of records started, therefore, with FY 1991 and ended with the current fiscal year.

The Center originally was classified under the Office of Interdisciplinary Programs and continued under that classification until FY 1997. It has been reported as a part of the College of Sciences, and of the School of Mathematics, for only the last two fiscal years.

According to the original proposal, it was apparently contemplated that the Center would consist initially of Dr. Chow and Dr. Hale, but that additional faculty would be added over the next five years. A review of the budget for FY 1998 shows the composition of the Center to be:

- A senior secretary.
- Another senior secretary (60%).
- Various fellows, research scientists, student assistants, graduate assistants, and summer faculty.

No permanent faculty member of the School of Mathematics is shown as being in the Center, and even Dr. Hale, as Director, does not have any part of his academic salary budgeted in the Center. This means that whatever costs would be appropriate for administrative directorship of the Center are borne by the School of Mathematics. If administrative support or general services are provided by other faculty members to the Center, these costs, too, are borne by the School of Mathematics.

The expenditures of the Center for FY 1991 through FY 1997, on Georgia Tech books, have been as follows:

FY 1991:	
General	\$161,732.70
Sponsored	<u>182,219.33</u>
	<u>\$343,952.03</u>
FY 1992:	
General	\$151,339.45
Sponsored	<u>166,675.51</u>
	<u>\$318,014.96</u>

FY 1993:	
General	\$150,777.04
Sponsored	<u>223,315.01</u>
	<u>\$374,092.05</u>
FY 1994:	
General	\$174,826.60
Sponsored	<u>185,637.68</u>
	<u>\$360,464.28</u>
FY 1995:	
General	\$155,323.69
Sponsored	<u>112,012.89</u>
	<u>\$267,336.58</u>
FY 1996:	
General	\$176,870.95
Sponsored	<u>123,465.57</u>
	<u>\$300,336.52</u>
FY 1997:	
General	\$162,723.76
Sponsored	<u>134,860.90</u>
	<u>\$297,584.66</u>

An analysis of these expenditures shows:

- Sponsored activity on Georgia Tech books has never reached the annual projected level of \$300,000 as indicated in the original proposal. The greatest amount of sponsored research for a single year was \$223,315.01 in FY 1993. The smallest amount was \$112,012.89 in FY 1995.
- Total Center expenditures were fairly constant for the first four fiscal years, ranging from a low of \$318,014.96 in FY 1992 to a high of \$374,092.05 in FY 1993.
- Center expenditures have been declining in the last three fiscal years.

It has been suggested that the increase in sponsored funding for the School of Mathematics over the past ten years may be attributable in part to the activities of the Center and to the reputation of Drs. Chow and Hale. We have no way of verifying, or quantifying, this suggestion.

b. Travel

Because of the significant amounts spent on travel, we have made a detailed analysis of this account. The results of this analysis are shown in the following schedules:

Schedule 1A: Payments by Georgia Institute of Technology, Fiscal Year 1988 through February 14, 1998

Schedule 1B: Payments by Georgia Tech Foundation, Fiscal Year 1994 through March 4, 1998

Schedule 1C: Payments by Georgia Tech Research Corporation, Fiscal Year 1991 through June 30, 1996

The payments by Georgia Tech are for the complete period of our review. The payments by the Foundation are for Fiscal Year 1994 through March 4, 1998, the period for which the Foundation provided information. The payments for the Georgia Tech Research Corporation are for Fiscal Year 1991 through June 30, 1996. At that time, the Research Corporation stopped recording Georgia Tech travel on its books and started transferring funds directly to the schools.

On the schedules, we have shown travel expenditures for the top 17 travelers for the School of Mathematics as shown on Georgia Tech records, Foundation records, and Research Corporation records. Total travel for all schedules was: Georgia Tech, \$795,931.86, of which \$243,670.83 was sponsored; Georgia Tech Foundation, \$46,693.40; and Georgia Tech Research Corporation, \$34,769.03, a grand total of \$877,394.29.

Dr. Chow had total travel costs of \$131,660.67 as shown on Schedules 1A, 1B, and 1C.

In addition to total travel costs, we have prepared Schedule 2 to show an analysis of reimbursement costs for travel for Dr. Chow from July 1, 1994, through February 13, 1998. This schedule shows trip dates, itinerary, trip amounts, source of funds, and check information. It also indicates that Dr. Chow had two previous, paid leaves of absence, each of two months duration during 1995 and 1996.

Dr. Chow's present leave of absence is an approved, paid leave from January 2, 1998, to September 30, 1998. Prior to the beginning of this leave, Dr. Chow was on vacation status from October 13, 1997, through December 31, 1997.

c. Journal of Differential Equations

At the time Dr. Hale accepted employment at Georgia Tech, he was editor of a publication called the *Journal of Differential Equations*. The publisher of this journal, Academic Press, Inc., reimbursed Brown University for the costs incurred by Dr. Hale in his position as editor. According to a budget submitted to the Academic Press for Fiscal Year 1989 the costs were as follows:

Secretarial Services (2-1/2 days per week)	\$11,000
Mailing Costs	2,000
Telephone	300
Supplies and Copying	<u>600</u>
Total	<u>\$13,900</u>

Dr. Hale in a letter to the Academic Press on June 22, 1988, enclosed this budget, stated that he would move the Journal to Georgia Tech on September 1, and requested that it allocate 1/6 to Brown University and the remainder to Georgia Tech.

He then said:

In order to avoid overhead on the budget, it is necessary to make this a gift [word underlined] to the Georgia Institute of Technology Foundation with the explicit statement that it is to be used for the *Journal of Differential Equations*. The funds will then go through the School of Mathematics for my use.

Since January 1, 1991, the Academic Press has contributed \$117,210.00 to the fund maintained by the Foundation to reimburse the SOM for the costs of the Journal and to provide an annual honorarium of \$2,000.00 to Dr. Hale. None of these funds have been used for the purposes intended: there has been no application of

funds either in the School of Mathematics or in the Center to defray the costs of the Journal, nor has Dr. Hale withdrawn any funds as an honorarium.

We recognize the fact that the funds provided by the Academic Press were called a "gift" and that Dr. Chow and Dr. Hale were given discretionary authority in the use of those funds; but a letter from the Senior Editor of the Academic Press to Dr. Chow on January 22, 1997, shows the clear intent of the Academic Press. We quote as follows:

Enclosed is our gift to the Georgia Institute of Technology Foundation, Inc. in the amount of \$8,645.00. This is for your and Dr. Hale's use in connection with the Journal of Differential Equations.

Our analysis of expenditures from this fund for the period from July 1, 1994, to January 30, 1998, according to information supplied to us by the Foundation for this period, totaled \$57,889.11. Major expenditures were: travel, \$34,797.06; entertainment, \$13,269.87; supplies, \$4,485.03; and moving expenses, \$3,206.34.

d. Other Foundation Funds

We identified three other Foundation funds that are significant to this review because they represent funds transferred to the Foundation by the School of Mathematics, as distinguished from funds which may have been raised by the Foundation itself. We were told by a Foundation spokesman that the Foundation accepts funds of this type on the basis of information supplied by the transferors and that there is no attempt to document the intent of the donors.

The funds in question were: Brigham Young University, Qnet Research Method, and the Harris Corporation. Brigham Young University paid the School of Mathematics the amount of \$44,480.00 to reimburse the school for the salary of Professor Chen, who conducted special studies at the University during 1992. Since Professor Chen's salary for the entire period of his absence was paid by the School of Mathematics, it was considered appropriate that reimbursement should come from Brigham Young. These funds were in reimbursement of a State expense and should have been retained in the School of Mathematics and expended there, or, if not

expended there, returned to the State as lapsed funds. These funds, according to the Office of Legal Affairs, may still be subject to lapsing.

Total funds of \$48,500.00 were contributed by Texas Instruments during 1991 and 1992 in recognition of benefits received from the Qnet Research Method of Dr. Jiangang Dai. The Harris Corporation contributed \$20,000.00 in 1996, also as the result of Dr. Dai's research. In none of these cases were amounts recorded on the books of the School of Mathematics as being a reduction of costs. Funds were expended by the Foundation principally for travel and entertainment and with lesser amounts being used for supplies, equipment, and subscriptions/dues.

In our review, it also came to our attention that the Foundation maintains a fund called the R.C. McFarland Mathematics Fellowship. According to Foundation records, this fund was established to support the McFarland Fellowship within the School of Mathematics. An alumnus contributed a total of \$21,000.00 to this fund during the period from January 1, 1991, through January 15, 1998. Disbursement records for the fund show that all expenditures have been for travel, entertainment, and supplies. Individual check requests show expenditures for staff luncheons, dinner for CDSNS seminar speakers, professional books, and even a baby shower for a staff member. Apparently, this School of Mathematics fund was used for both Mathematics and Center expenditures.

If the McFarland fund had been intended for fellowship use, proper accounting procedures would have required that a fellowship account be established on the books of the Institute and that the funds be expended there after transfer from the Foundation.

e. Institute-Related Expenditures of the Foundation

In a prior audit of the Georgia Tech Foundation in 1993, we found that the Foundation, in addition to its regular functions as detailed in the Articles of Incorporation, also provides needed support to the Institute in making funds available for such things as moving, entertainment, and similar types of expenses that are not allowed by the State. There should be, however, a clear delineation between those expenditures which are appropriate for the Foundation and those which represent expenses of the Institute. There is no intent here to inhibit the Foundation or unduly

restrict it in the achievement of its objectives; but it should not be recording on its books those things that fit into the Institute's defined operations as a University. For example, unless there is an identified exception, travel is a regular expense of the Institute and should be recorded on Institute books where it would receive established Institute handling and oversight. Similarly, expenditures for supplies, equipment, and subscriptions are a part of normal Institute operating costs and should not be fragmented by appearing both on Foundation and Institute records.

State law, Code Section 50-6-27, requires that the State auditor prepare each year a report showing the entire personnel of every State agency, including the University System of Georgia, with the salary and travel expense of each individual. If travel expense is recorded both on Foundation books and Georgia Tech books, the Institute is not providing proper information to the State auditor for his use in preparing the mandated report.

The mechanism for recording costs on Institute books is clear and well-defined: create accounts on the Institute's books and then pass the money for operations from the Foundation to the Institute through restricted funds or other designated methods. In this way, support comes from Foundation funds, but the activities are recorded where they should be, as a part of university operations.

We recognize that the School of Mathematics, along with other schools on campus, does not have clear guidance on the described method of recording expenditures and that it was simply following usual Institute patterns in having all of these expenditures recorded on Foundation books.

Because of the issues involved, we expect to make a separate report on the cooperative relationship between the Foundation and the Institute.

f. Video-based Instruction

In the course of our interviews, one professor related the history of video instruction on the Georgia Tech campus and told how the program had been started in 1978 with the strong support of Dr. Pettit, who fashioned the program after the one being used at Stanford. In order to encourage faculty members to participate in the program, Dr. Pettit instituted a provision whereby the administration agreed to supply funds to the school of the faculty member on the basis of the revenue

generated by each instructor's course. After deduction of a 5% administrative charge, those funds could then be used by the instructor for travel, books, or any other professional purpose except as a salary supplement.

The professor related an experience that he had in 1993 when he wished to make a trip to England and requested that he be allowed to use some of his accumulated funds. Dr. Chow would not allow him to use these funds but suggested that he go to the Foundation for 50% of the cost of the trip. The professor felt that he was pressured to overestimate the amount provided by the foreign sponsor in order to inflate the matching amount being provided by the Foundation. Dr. Chow does not agree with this assessment.

The School of Mathematics in 1993 adopted a rule that a video instructor could retain for his use only the first \$1,000 of course-generated revenue and that the remainder would revert to the School. Although the adoption of such a rule is clearly within the authority of the Chair and his Executive Committee, we must express concern for two reasons: the rule is the most restrictive of any on campus and for that reason could possibly discourage the development of video teaching; likewise, this restrictive handling would seem to be in contradiction of the objectives expressed in the strategic plan for the Institute.

Our investigation of the plans in effect for the distribution of video revenue showed these methods:

- One school allows the video instructor to designate the use of all revenue.
- One school allows the video instructor to retain the first \$3,500 for his use.
- One school has a 50/50 distribution.

As indicated, the SOM rule of allowing each video instructor to retain only the first \$1,000 of course-generated revenue is the most restrictive of all plans in effect. The School of Mathematics in Fiscal Year 1997 had total video revenue of \$25,386.00.

The Strategic Plan speaks of taking fullest advantage of educational and information technology and states that Georgia Tech will:

- encourage and sustain efforts in multimedia, educational, and distance learning technology,
- encourage faculty to use the campus cable television system and revamp some classrooms so that visuals, video, audio, on-line graphics, simulation, and direct Internet connections can be used; and
- help expand the use of distance learning technology throughout Georgia's educational system.

Institute officials may wish to consider the adoption of a uniform Institute policy on the distribution of revenue from video instruction.

g. Securing of Documents

We have reviewed Dr. Hill's requests for records, have conferred with representatives of the Office of Legal Affairs, and agree with them that a good-faith effort is being made to supply Dr. Hill with the documents requested. Delays encountered have resulted primarily from difficulties in identifying the requested documents and logistical problems in finding them.

We call attention, however, to two instances in which erroneous information was given to Dr. Hill:

- After a request for records relating to the "source and disbursement of funds to and from the Center for Dynamical Systems and Nonlinear Studies during the period 1988 to the present," Dr. Hill was told that there were no such records. As our report indicated, separate records for the Center were established in 1991 and certainly have existed since that time.
- After a request for a record of the "disbursement of T.V. or video instructional funds from 1990 to the present," Dr. Hill was told that the School of Mathematics did not maintain separate accounts for these funds. As a matter of fact, this information is contained in Account No. G-37-280, called Video-based Instruction System.

The Office of Legal Affairs, in responding to Dr. Hill's requests, relied upon information provided to it by representatives of the Center or the School of Mathematics. This information was incorrect.

In a third situation where Dr. Hill asked for information from the Office of the Dean of the College of Sciences on travel requests and approvals for Foundation

payments, it was determined that the Dean's Office does not actually maintain files on these documents. Once the approvals have been given, the documents are appropriately forwarded without the retention of approved copies.

5. Conclusion

There is general agreement that the academic reputation of the School of Mathematics has increased over the past ten years and that the Center for Dynamical Systems and Nonlinear Studies has contributed to this enhanced reputation. Yet, in spite of this improvement, there exists "confusion and stress on the fabric of SOM as to the real relationship between SOM and CDSNS." The perception that the Center was draining resources from the School of Mathematics led to this audit, and certainly all issues may not have been definitively resolved.

We add our recommendations to those of the Review and Evaluation Committee:

- That the Chair adopt more open and democratic processes.
- That all faculty members be fully informed of the relationship between the School of Mathematics and the Center.
- That the Chair, if he has a bias toward the Center, take extraordinary precautions whenever a decision is made, to reassure the SOM faculty that the decision was fair and impartial.

Respectfully submitted,



H.T. Marshall
Director of Internal Auditing

Participating Auditors:
Carl Johnson, Audit Manager
Larry Webster, Auditor

HTM/pfm/AU98-29

**SCHOOL OF MATHEMATICS TRAVEL
FISCAL YEAR 1988 THROUGH FEBRUARY 14, 1998**

Payments by Georgia Institute of Technology

<i>Name</i>	<i>State</i>	<i>Sponsored</i>	<i>Total</i>	<i>Time Period of Travel</i>
Shui-Nee Chow	\$ 25,638.96	\$ 61,944.69	\$ 87,583.65	1989 - 1998
Theodore P. Hill	4,666.62	47,452.64	52,119.26	1988 - 1998
Robin Thomas	1,978.35	48,540.16	50,518.51	1990 - 1998
Wing Suet Li	1,760.00	39,098.67	40,858.67	1993 - 1998
Ying Fei Yi	1,081.27	39,780.21	40,861.48	1991 - 1998
Michael Loss	3,551.58	18,053.60	21,605.18	1989 - 1998
Evans M. Harrell	1,670.62	18,912.07	20,582.69	1988 - 1998
Konstantin Mischaikow	5,082.19	19,148.10	24,230.29	1990 - 1997
Shi Jin	3,711.80	15,131.90	18,843.70	1994 - 1998
Jack K. Hale	6,341.70	11,427.74	17,769.44	1990 - 1998
Donald J. Estep	5,913.37	9,396.57	15,309.94	1988 - 1998
Leonid Bunimovich	4,074.63	12,881.65	16,956.28	1992 - 1998
Luca Dieci	1,727.65	14,291.27	16,018.92	1989 - 1998
Xingxing Yu	2,063.34	9,008.73	11,072.07	1991 - 1997
Ernst Stephan	1,162.80	6,083.12	7,245.92	1988 - 1991
Christian Houdre	3,554.73	2,636.66	6,191.39	1995 - 1997
Xu-Yan Chen	<u>0.00</u>	<u>3,664.98</u>	<u>3,664.98</u>	1991 - 1996
Subtotal	\$ 73,979.61	\$377,452.76	\$451,432.37	
All Others	169,691.22	174,808.27	344,499.49	
Totals	\$243,670.83	\$552,261.03	\$795,931.86	

**SCHOOL OF MATHEMATICS TRAVEL
FISCAL YEAR 1994 THROUGH MARCH 4, 1998**

Payments by Georgia Tech Foundation

<i>Name</i>	<i>State</i>
<i>Shui-Nee Chow</i>	<i>\$40,704.06</i>
<i>Theodore P. Hill</i>	<i>0.00</i>
<i>Robin Thomas</i>	<i>0.00</i>
<i>Wing Suet Li</i>	<i>127.50</i>
<i>Ying Fei Yi</i>	<i>0.00</i>
<i>Michael Loss</i>	<i>0.00</i>
<i>Evans M. Harrell</i>	<i>0.00</i>
<i>Konstantin Mischaikow</i>	<i>0.00</i>
<i>Shi Jin</i>	<i>0.00</i>
<i>Jack K. Hale</i>	<i>0.00</i>
<i>Donald J. Estep</i>	<i>0.00</i>
<i>Leonid Bunimovich</i>	<i>0.00</i>
<i>Luca Dieci</i>	<i>6.00</i>
<i>Xingxing Yu</i>	<i>0.00</i>
<i>Ernst Stephen</i>	<i>0.00</i>
<i>Christien Houdre</i>	<i>0.00</i>
<i>Xu-Yan Chen</i>	<i>0.00</i>
<i>Subtotal</i>	<i>\$40,837.56</i>
<i>All Others</i>	<i><u>5,855.84</u></i>
<i>Grand Total</i>	<i><u>\$ 46,693.40</u></i>

**SCHOOL OF MATHEMATICS TRAVEL
FISCAL YEAR 1991 THROUGH JUNE 30, 1996**

Payments by Georgia Tech Research Corporation

<i>Name</i>	<i>State</i>
<i>Shui-Nee Chow</i>	<i>\$ 3,372.96</i>
<i>Theodore P. Hill</i>	<i>0.00</i>
<i>Robin Thomas</i>	<i>3,396.45</i>
<i>Wing Suet Li</i>	<i>1,932.00</i>
<i>Ying Fei Yi</i>	<i>2,180.32</i>
<i>Michael Loss</i>	<i>0.00</i>
<i>Evans M. Harrell</i>	<i>718.87</i>
<i>Konstantin Mischaikow</i>	<i>1,405.88</i>
<i>Shi Jin</i>	<i>2,700.03</i>
<i>Jack K. Hale</i>	<i>0.00</i>
<i>Donald J. Estep</i>	<i>971.65</i>
<i>Leonid Bunimovich</i>	<i>2,248.80</i>
<i>Luca Dieci</i>	<i>1,127.53</i>
<i>Xingxing Yu</i>	<i>870.00</i>
<i>Ernst Stephan</i>	<i>0.00</i>
<i>Christian Houdre</i>	<i>2,141.26</i>
<i>Xu-Yan Chen</i>	<i><u>725.24</u></i>
<i>Subtotal</i>	<i>\$ 23,790.99</i>
<i>All Others</i>	<i><u>10,978.04</u></i>
<i>Grand Total</i>	<i>\$ 34,769.03</i>

**ANALYSIS OF REIMBURSEMENT COSTS FOR TRAVEL
BY DR. SHUI-NEE CHOW**

July 1, 1994, through February 13, 1998

Trip Dates	Itinerary	Purpose	Trip Amount	Source of Funds	Check Amount	Check Number	Check Date
February 11, 1998 to February 13, 1998	Singapore/ Bangkok/ Singapore	To conduct research and give a talk at Mahidol University.	\$ 566.37	GTF: I4607J Journal of Differential Equations	\$4,538.26	206996	03/04/98
January 10, 1998 to January 17, 1998	Singapore/ Germany/ Singapore	Attend conference on Geometric Theory of Delayed Differential Equations.	2,302.59	GTF: I4607J Journal of Differential Equations		206996	03/04/98
December 21, 1997 and February 20, 1998	Atlanta/ Singapore/ Atlanta	Airfare costs.	1,669.30	GTF: I4607J Journal of Differential Equations		206996	03/04/98
November 11, 1997 to November 14, 1997	Singapore/ Beijing/ Singapore	Invited to conduct research at Beijing University, Academia Sinica, and Tsinghua University.	1,163.70	GTF: I4607J Journal of Differential Equations	2,820.49	203880	12/18/97
October 11, 1997 to October 15, 1997	Atlanta/ Singapore/ Atlanta	Conduct research at National University of Singapore.	1,656.79	GTF: I4607J Journal of Differential Equations		203880	12/18/97
September 18, 1997 to September 24, 1997	Atlanta/ Venezuela/ Atlanta	To attend the Reunion Sobre Ecuaciones Diferenciales Conferencia	913.30	GTF: I4607J Journal of Differential Equations	913.30	200995	10/02/97
August 9, 1997 to August 31, 1997	Atlanta/Taipei and Singapore/ Atlanta	Trip to Taipei and Singapore. Included partial airfare.	1,641.64	GTF: I4607J Journal of Differential Equations	1,641.64	200566	09/23/97
June 26, 1997 to July 12, 1997	Atlanta/Yukon, Canada and University of Washington/ Atlanta	Principal speaker at the International Conference on Nonlinear Phenomena in Dynamical Systems and Variational Problems.	4,013.62	GTF: I4607J Journal of Differential Equations	4,013.62	117443	08/19/97

**ANALYSIS OF REIMBURSEMENT COSTS FOR TRAVEL
BY DR. SHUI-NEE CHOW**

July 1, 1994, through February 13, 1998

Trip Dates	Itinerary	Purpose	Trip Amount	Source of Funds	Check Amount	Check Number	Check Date
May 24, 1997 to June 7, 1997	Atlanta/ Los Angeles, Taiwan, and Singapore/ Atlanta	To present talks and collaborate on research at Tamkang University and at the National University of Singapore.	\$4,030.20	GTF: I4606J R.C. McFarland Fellowship GT: G-37200	\$2,236.50	116231	07/09/97
May 13, 1997 to May 21, 1997	Atlanta/ Provo, Utah/ Atlanta	Presentation at the Fourth Siam Conference at Brigham Young University.	1,576.05	GTF: I4607J Journal of Differential Equations	1,576.05	114942	06/06/97
March 21, 1997 to April 6, 1997	Atlanta/ Los Angeles, Taiwan, and Singapore/ Atlanta	Collaborated on research at Taipei and spoke at the National University of Singapore (foreign airfare paid by outside sponsor).	1,885.86	GTF: I4607J Journal of Differential Equations	1,885.86	113581	04/30/97
December 30, 1996 to January 13, 1997	Atlanta/ San Francisco, Taiwan, and Singapore/ Atlanta	Collaborated on research at Taipei and spoke at the Tankang University.	4,653.01	GTF: I4607J Journal of Differential Equations GT: B-06613	3,680.84	110154	01/30/97
November 22, 1996 to December 2, 1996	Atlanta/ Taiwan/ Atlanta	Attended conference on Dynamical Systems and Applications.	2,613.49	GTF: I4607 Journal of Differential Equations	2,613.49	108504	12/11/96
October 26, 1996 to November 2, 1996	Atlanta/ Brazil/ Atlanta	Attended workshop on Differential Equations and Nonlinear Analysis at University of Sao Carlos. This is meals and visa costs only. No other reimbursement(s) noted.	280.00	GT: G-37200	280.00	455054	12/10/96

**ANALYSIS OF REIMBURSEMENT COSTS FOR TRAVEL
BY DR. SHUI-NEE CHOW**

July 1, 1994, through February 13, 1998

Trip Dates	Where	Purpose	Trip Amount	Source of Funds	Check Amount	Check Number	Check Date
August 22, 1996 to September 4, 1996	Atlanta/ Edmonton, Canada and Washington, D.C./ Atlanta	To work on mathematical problems with researchers at the University of Alberta, Canada and meet with National Science Foundation scientists in Washington, D.C.	\$2,992.71	GTF: I4606J R.C. McFarland Fellowship GT: B-06605	\$1,203.65 1,789.06	105936 428453	09/19/96 09/16/96
May 1, 1996 to July 29, 1996	Atlanta/ Taiwan/ Atlanta	Research at the Institute of Applied Mathematics of Tsing for two months. Second check was for lodging costs. Third check was for partial airfare. During visit, went to Hengzhou, China from 6/23 until 7/4.	7,127.76	GTF: I4607J Journal of Differential Equations GTF: I4607J Journal of Differential Equations	3,307.47 909.99	104855 106817	08/08/96 10/24/96
March 9, 1996 to March 12, 1996	Atlanta/ Pine Mountain, Georgia/ Atlanta	U.S./Japan Conference at Callaway Gardens.	828.61	GT: G-37200 GT: B-06607 GTF: I4607J Journal of Differential Equations	1,200.00 1,620.30 828.61	400812 421184 100046	05/22/96 08/15/96 03/25/96
October 25, 1996 to January 1, 1996	Atlanta/ Taiwan/ Atlanta	On paid leave of absence for two months. Visited and conducted research at the Institute of Applied Mathematics of Tsing Hua University.	5,284.83	GTF: I4607J Journal of Differential Equations GT: G-37200 GT: B-06605	1,614.95 2,669.88 1,000.00	95307 365049 339979	10/30/95 01/23/96 10/22/95

**ANALYSIS OF REIMBURSEMENT COSTS FOR TRAVEL
BY DR. SHUI-NEE CHOW**

July 1, 1994, through February 13, 1998

Trip Dates	Itinerary	Purpose	Trip Amount	Source of Funds	Check Amount	Check Number	Check Date
April 6, 1995 to April 16, 1995	Atlanta/ New Zealand/ Atlanta	Visit the University of Auehland, Christ-Church, New Zealand. Reimbursement for prepayment of hotel charges for this trip.	\$ 3,275.42	GTF: I4607J Journal of Differential Equations GTF: I4607J Journal of Differential Equations	\$ 2,627.42 648.00	89305 88801	05/04/95 04/20/95
December 13, 1994 to January 4, 1995	Atlanta/ Hong Kong, Taipei, and Singapore/ Atlanta	Attended conference in Hong Kong and gave invited talk at 1994 Sino- Japanese joint workshop in Taipei. Airfare for trip.	4,256.44	GTF: I4607J Journal of Differential Equations GTF: I4607J Journal of Differential Equations	1,797.49 <u>2,458.95</u>	85324 84304	01/19/95 12/13/94
Totals			<u>\$52,731.69</u>		<u>\$52,731.69</u>		

GTF = Georgia Tech Foundation
GT = Georgia Institute of Technology

NOTE: The total of GTF disbursements on this schedule is \$41,406.58, whereas the total of travel disbursements on Schedule 1B is \$40,704.06. The difference of \$702.52 represents entertainment expenses included in the check amounts on this schedule.