Forward by the Chairman

As I am writing this opening remark, preparations for the University’s 40th Anniversary celebration are at the peak. I joined CUHK in its second year of establishment, then left for twenty five years abroad after graduation, and came back to serve the Department in recent years. I cannot stop asking myself: What has been changed and accomplished? What are our goals and directions?

The Department started as a coalition of three small departments from Chung Chi, New Asia and United College. The most significant development at that time was the recruitments of two young dedicated fresh Ph.D.’s: K.F. Ng (吳恭孚) and Y.C. Wong (黃友川). Besides regular teaching, they initiated a seminar group in Functional Analysis. Although a very small group, the participants were highly motivated, including S.T. Yau (丘成桐) (Harvard, CUHK, Fields Medalist), S.Y. Cheng (鄭紹遠) (HKUST, Chairman), C.H. Chu (朱鏡濤) (London U, Chair Professor) and myself. Professor Ng has been awarded an Exemplary Teaching Award this year, and he has written an article for this Newsletter. Professor Wong passed away eight years ago after a lifetime of achievements.

The impact of Yau’s astounding breakthroughs in Differential Geometry, Partial Differential Equation and Mathematical Physics in the seventies were tremendous. He quickly ascended to the pinnacle of the mathematics world, and the area of Geometric Analysis was coined after him. No doubt his accomplishment had generated much fascination, admiration and followers everywhere. He is now leading the Institute of Mathematical Sciences in the University. The joint force of the Department and the Institute has achieved research results that could not have been imagined years ago. Yau is going to give a public talk on “一個中大數學家的故事” to kick off the 40th Anniversary.

Our long tradition is the high quality of teaching. It is emphasized even more nowadays, not to be belittled by the research effort. As a result we are able to attract the most outstanding students. You can see in this newsletter the reports on the students with honors and scholarships, the exchange programme, the Enrichment Programme for Young Mathematics Talents. The most impressive accomplishment of the Department is reflected in its alumni making significant contributions in all aspects of life in Hong Kong and elsewhere. Just as an example, of the alumni in the graduate class of 1982, there are two chartered actuaries, two senior government officers, one school principal, numerous vice principals, four mathematics professors and one financial professor.

We have played with the idea of having a newsletter for the alumni, teachers, colleagues and friends of the Department for some time. This summer, I attended a thirty-year reunion at the University of Washington, Seattle where I got my Ph.D. The event brought back a lot of nice memories; it was heartening to see the developments in the Alma Mater. I came back more convinced that it is a good idea to have a newsletter, even on an annual basis. With the support of my colleagues, we have started this first issue. We hope that this newsletter will offer you a glimpse of the recent events in this vibrant Department that we are proud of, and we will be grateful for your support in various ways. Finally I wish every one of you a prosperous and fruitful academic year.

Ka-Sing Lau
In the early nineties, Professor S.T. Yau had the vision to establish a mathematics institute based in Hong Kong that would lead the research of mathematical sciences in China, Asia and abroad. With the enthusiastic support of the University and colleagues, the Institute of Mathematical Sciences (IMS) was established in 1993. It was first funded by a one-time block grant from the University, in subsequent years Professor Yau has successfully raised enough donations to restructure the IMS to be privately funded. This was actually achieved way in advance of the recent advocacy by the Government to drive for public donation to support research in higher education.

One of the most significant recruitments of the IMS was Professor Zhouping Xin (辛周平) from the Courant Institute in New York University; he is now the Associate Director. In the past several years, the IMS has developed and consolidated some key research areas, with special emphasis in geometry and applied analysis. Professors Yau and Kang Zuo (左康) lead the geometry group; they have obtained a series of important results concerning the geometry on the moduli stacks of polarized manifolds and Shimura curves. Professor Xin, who has made important breakthroughs recently in the multi-dimensional shock wave theory and Prandtl’s boundary layer theory, leads the applied analysis group. The other important members are Professor Xi-Ping Zhu (朱熹平) and Professor Chong-Qing Cheng (程崇慶). They have permanent positions in China and they come to the IMS on a regular basis. Prof. Zhu has used curvature flows to obtain several important results on the geometric properties and complex structures of complete non-compact manifolds. Professor Cheng’s expertise is dynamical systems. Recently, he made some crucial progress on the famous Arnold diffusion problem. In addition the IMS has members from the Mathematics, Statistics, Physics and Engineering Departments, they also contribute greatly to the programme.

A research institute will not be successful without a flow of young dedicated researchers. In view of this, the IMS started to enroll postgraduate research students since 1999. So far ten Ph.D. have graduated from this programme, with a further 16 Ph.D. candidates currently coming from Hong Kong, Mainland and Taiwan.

The postdoctoral programme has attracted more than 30 young scientists from all over the world for long-term and short-term visits. The IMS has provided regular topics courses, colloquia, weekly seminars, working seminars and various lecture series by the visiting members. In order to attract more youngsters, the IMS and the Mathematics Department have co-sponsored a special programme — Enrichment Programme for Young Mathematics Talents, for the higher form pre-university students with exceptional ability and interest in mathematics. These students are exposed to some interesting mathematics and cutting-edge research through expository lectures and interaction with these visitors.

The senior visiting member programme has attracted many distinguished scientists from all over the world, a few from a long list are P. Lax, R. Schoen, J. Mather, D. Stroock, R. Hamilton, J. Coates, L. Yang, Chaohao Gu. Over the years, the IMS has organized more than 30 international conferences in various fields and has built close working relationships with the affiliated departments at CUHK as well as the mathematics departments in the other universities. Internationally the IMS has formal cooperation agreements with many leading research institutions, such as CAS (Beijing), MSRI (Berkeley), Courant (NYU), Harvard, MIT, IHES (Paris), NCTS (Taiwan), Nanjing University, Zhongshan University.

Prof. Zhouping Xin

The IMS also manages three international research journals, they are The Asian Journal of Mathematics, Methods and Applications of Analysis and Communications in Information and Systems.

Thanks to the arrangement of the University, the IMS has moved to a new building (Academic Building No.1) recently. It occupies three floors and has a nice view of the Tolo Harbor. In all respects, the IMS is moving up rapidly in the right track and will be more successful in the future.

Web: http://www.ims.cuhk.edu.hk/
Tel: (852) 2609-8038, Fax: (852) 2603-7636
中大數學系四十年之教與學

吳恭孚

中文大學數學系自創校至現今，歷經學術推展與社會責任的轉變。四十年間，數學系不僅在教學、研究及服務方面取得了傑出的成就，亦在社會上扮演了重要的角色。系內的師資陣容強大，教學和研究成果豐碩。數學系亦在應用數學和理論數學領域不斷拓展，為社會經濟發展提供了堅實的基礎。

本人有幸參與數學系的建設與發展，對數學系的成就深感自豪。數學系的教學和研究工作，尤其是數學系在應用數學領域的發展，為社會經濟的發展提供了重要的支持。數學系亦在社會責任方面積極扮演角色，為社會提供數學相關的教育和培訓，為社會各界的人士提供學習和成長的機會。

交流點滴——REU經驗談

黃俊偉(Carto)

在數學系的安排下，我和楊名森同學於2002年暑假到了美國康奈爾大學(Cornell University)參加為期兩個月的REU（Research Experiences for Undergraduates Program）計劃。這個計劃的目的是讓本科生有機會參與數學研究工作，從中獲取經驗及擴闊眼界。我們非常感謝楊名森老師和香港中文大學數學科學研究所的慷慨資助，讓我們成為首批參與REU的香港學生。

在康奈爾大學的兩個月間，我們跟隨Professor Robert Strichartz，協助他進行一些分形分析(Fractal Analysis)的研究，我體會到研究工作是怎樣一會事，吸收到了不少寶貴的經驗。這次經歷為我更清楚自己將來的道路，也讓我決心投入數學研究工作。除了數學上的得益外，我對美國文化的認識亦增加了。我認識了幾位美國朋友，體驗到美國的生活，參觀過當地的名勝，這種種回憶比起數學上的知識更為難得。

回港之後，我們繼續協助Professor Robert Strichartz完成了兩篇論文，題目分別為「The p-Laplacian on the Sierpinski Gasket」和「Calculus on the Sierpinski Gasket I: Polynomials, Exponentials and Power Series」。

關於我們在REU期間的工作可參考
http://www.mathlab.com伊拉克/carto/

作者(左一)和系內同學楊名森(左二)在美國當地與當地的朋友合照。
A few words on our restructured M. Sc. Programme

Hing Sun Luk

Guess when our M.Phil. and Ph.D. programmes were started. (Answer: the former in 1973 and the latter in 1988.) In contrast, our M.Sc. programme was started only in 1995. From a rather modest beginning, it has now become a well-developed and popular programme. This year (2003-2004), there will be 38 first year students and 11 second year students in the programme, which is an encouraging indication that the programme is helping more graduates and serving their needs.

Indeed many courses have been designed for the M.Sc. programme. The most recent ones are Linear Analysis, Algebra and Geometry, Mathematics for Logistics, and Modeling and Optimization of Supply Chains. It can be observed that there is a good mix of "pure" and "applied" mathematics, catering for demands from the discipline on the one hand and from applications on the other hand.

Since the majority of M.Sc. students are part-time students, most of the courses are taught in the evening or on Saturday. These days when jobs are becoming ever more demanding, it is touching to see our part-time students coming to class after a hard day’s work. Enthusiastically too. Some are good teachers themselves. Even a working mother, who happily showed the class a photo of her new-born baby.

Many M.Sc. students are not fresh graduates. A few of them were not mathematics majors but would like to do graduate studies in mathematics. Hence, the programme also endeavors to provide more individual guidance to students with different backgrounds. This is done in the courses Guided Studies I and II. The former helps students acquire the necessary prerequisites and "mathematical maturity", while the latter leads students to possible research areas. M.Sc. students, too, would find Prof. K.F. Ng (Head of Graduate Division) always ready to give them valuable advice and guidance in their studies.

In mathematics, one is most easily impressed by the young and gifted who seem to have early in their lives decided on a career in research. However, it may be that the future development and application of mathematics in Hong Kong also requires more people to know mathematics beyond the undergraduate level. In that perspective, namely, deeper mathematics for more people, our M.Sc. programme is a very worthwhile effort.
數學新浪潮

一浪接一浪，每浪激新，
一浪接一浪，每浪精采！

圖像處理中的數學——矩陣的應用

本年度的數學新浪潮講座:
「從畢氏定理談起」將於2003年11月15日舉行，敬請留意我們的海報，勿勿錯過！

奬學金消息

近年來，本系同學的學業成績不斷提升。我們有多位中學會考的八至十優生，會考成績的三至五優生。在2002-03學年度，我系本科生共獲得三十九項奨學金，其中由一年級同學獲取的有十二項。這些奨項中，包括多個跨院校競爭激烈的奨項，如賽馬奨學金、尤登爵士紀念奨學金等。此外，還有兩位同學獲得奨學金，在暑期到美國康奈爾大學參加研究工作：一位同學獲得美國加州大學洛杉磯分校的資助，以便參加他們的暑期研究工作；一位同學得到資助到加州大學柏克萊分校參加暑期課程；一位同學得到國際性資助（等同奨學金）到澳洲著名研究中心（The Abdus Salam International Centre for Theoretical Physics）參加國際性研究培訓計劃。

2002/03院長榮譽錄
數學系優異生名單

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我們的系會 The Elements

梁維恩(Libra)

各位:

你們好! 我是2002-03年度數學系系會「The Elements」的主席Libra。系會名稱為「The Elements」，因為我們認為數學系會是一個多元和多角度的元素，我們承諾為同學提供一切需要資源，並希望能夠成為大家心目中的「The Elements」。

在過去的一年，數學系會秉承以往精神，盡心盡力為各位數學系的同學服務，使到到中大數學系更有一份凝聚力。例如，我們定期舉辦的懶人會、球類比賽及各種活動，除了讓各位同學舒展身心外，亦能讓他們更加認識對方，更協力齊心。

此外，今年的重點活動－－頒獎和迎新都不比以往遙遠。今年的迎新，我們十分榮幸能夠邀請多位教授出席，不少校友也蒞臨。當然，少不了各位「老友」的寫信，使到大家都盡興而歸。在迎新方面，為了鼓勵新生受到中大數學系的團結精神，我們傾力籌辦迎新活動。而在迎新會後，我們亦安排了多個適合「開學班」，讓他們更加了解數學系。

雖然我們籌辦的活動得到不少讚賞，但我們知道，我們仍然有很多需要改善的地方，因此，我們希望各位師兄師姐能夠多留意系會的動向，並提供你們寶貴的意見。最後，謹代表數學系系會衷心多謝各位的支持!!!

網址: http://ithome.cuhk.edu.hk/~z045630/the_elements.swf
新聞組: news://news.cuhk.edu.hk/cubk.math.forum
培育英才，創建將來

區國強

若你的班上有十多個會考7A到10A的學生，還有一些早已熟讀大學程度數學書本的學生，你會怎樣教導他們呢？這兩年，我都負責教授「數學英才精英課程」的暑期班，班裡的中學生就是這樣的精英。也許香港數學最好的高中學生，大都在這班上。他們的求學態度、敏銳才思和課堂反應都是無與倫比的。有機會參與這個課程並走進教導這批學生，是十分寶貴的經驗和挑戰。

面對天才橫溢的學生，我們更鼓勵踏實和努力學習。丘成桐教授曾有傳媒說：「我們不是要訓練天才。」課程的目標在於讓學生知道自身的不足而更加奮發進深，所以我們的科目內容絕不容易，對這批本地中學的優秀，課程還是相當深奧的。不過，學生並沒有因而卻步；相反，他們十分喜歡這樣的課程，其實，能力出眾的學生所感興趣的，不是一個只會獎勵小聰明的課程。我們曾教授的課題全都是大學程度的學問，這究竟會不會摧殘學生呢？我們深信只要通過適當的表述和編排，便可讓學生領略這些高等學問的重點，從而產生學習的興趣，進而掌握一些相當抽象的概念和處理複雜的計算。

數學系認為香港若要發展科技和知識型經濟，必先全面提高數理水平。而推動物理的學生的數學教育，是數學系的一項重點工作。我們參考了不少外國的經驗，構思開辦為高年學生而設的數學課程，但香港的經度下滑，要開辦一個優質課程談何容易。

兩年前得到私人捐款，「數學英才精英課程」才能順利創辦。我們的主要贊助人是在港經銷的美國人，他的成功投資都因良好的數學計算而來，所以慷慨解囊，回饋數學。

我們為這課程投入了很大的資源，去年暑期，秋季、春季和今年暑期的4班，教學人員和學生比例近乎1:5。此外，這年多以來的客席講者，有來自英國劍橋、倫敦；亦有來自美國哈佛、加州、哥倫比亞、明尼蘇達州、伊利諾州和臺灣清華、中山等著名大學的教授。如果不是SARS的影響，還會有兩位史丹福大學的教授到訪。學生在學者的親身教導下，能得到前所未有的國際視野，從而加深學養並對將來的事業發展大有幫助。

要提供如此優質的課程，實非僅是金錢所能促成的。有賴我們在教育前線的校友，我們才能為本地教育有足夠了解，設計出合適的課程，和培養出優秀的學生。另外，要邀請知名學者遠道而來，也要憑藉中文大學數學系長期在國際上的聲譽。

這類資優課程在北美的大學已十分普遍，而在香港卻還是刚刚起步。我們這年多亦能從實踐中探索，累積經驗。縱使如此，我們已看到一些令人鼓舞的成績。希望幾年後，我們的畢業生會在香港科技發展使命中扮演重要的角色。
數學教育論壇：
教育改革之路

香港中文大學數學系，數學科學研究所，香港數學會及香港教育局於2002年7月13日，在沙田百立中學聯合法舉辦「數學教育論壇——教育改革之路」研討會。

這次論壇邀得丘成桐教授 (哈佛大學及中大數學系所長)，鄭希達教授 (科大科學院副院長)、Wilfried Schmid教授 (哈佛大學)、Benedict H. Gross教授 (哈佛數學系系主任)，課程發展處的李柏良先生及教育局的馬紹良先生一同探討香港數學教育的新方向。出席的二百多人中，有大學教授、學校教師、學生及有關數學教育的各界人士，參與者熱烈，群情激昂。

各界捐款

數學科學研究所與數學系一直以來得到不少友好和校友的熱心捐款，使我們能教學研究及學術科研的重要工作得以順利進行。捐款的範圍很廣，例如，數學科學研究所成立的捐款基金，支持絕大部分研究項目的運作；數學系則設立了本科生和研究生獎學金、交流資助及多項獎項，以激勵學生學習。

對於這些捐款，我們深表謝意；同時，更希望各方友好和校友能繼續支持我們，熱心捐款。如閣下有意捐款，請與丘成桐教授(yuu@math.harvard.edu) 或劉家成教授(2699-7966, ksial@math.cuhk.edu.hk)聯絡。

在此，我們謹向最敬重數學科學研究所與數學系捐款的各位熱心人士致謝。

郭錦年先生，李嘉誠先生，William Benter先生，鬍百豪先生，朱嘉鑨教授，丘成桐教授，林健忠先生，馬紹良先生，張國均教授，陳漢夫教授及數學系各同事。

暑期就業培訓

一向以來，數學系的同學都熱心於數理分析和邏輯思維，對新科技掌握較快，這些優越的能力是各行各業所渴求的。然而，這些在學院求學的同學卻難以把學問落實的機會。數學系近年積極推行「暑期就業培訓計劃」，安排同學在暑假期間，在實際的環境中工作，汲取經驗。數學的應用廣泛，同學可以在不同行業的機構中實習。當然，由於我們的畢業生的數學根基好，一向深受教育界歡迎，自然使教育成為培訓計劃中不可缺少的一環。

推行訓練計劃，有賴各機構的協助和投資，得到熱心教育人士和校友的幫助，支持這計劃的機構日增，為同學帶來更多的實習機會。在此，謹向支持我們的友好及機構致謝。

翁以登博士，何福敏女士 (香港總商會) 關百豪先生 (香港投資集團) 陳光宗先生，劉梁肇國女士 (上海商業銀行) 謝建明先生 (中航航空服務有限公司) 陳潔良校長 (中華基督教會基朗中學) 張百豪校長 (香港中文大學) 曹啟樂校長 (教育評議會會長) 方順源校長 (中華基督教會陳李錦芬中學) 許小光校長 (五邑司徒浩中學) 許為天校長 (紫薇堂顧問) 曾有成校長 (中華基督教會桂華山中學) 汪曼華校長 (中華基督教會篤恩中學) 翁德文校長 (中華基督教會基協中學)。

此外，和電訊和電訊企業均熱心為我們的學生尋找合適的培訓機會。

同學到這些機構實習，有些要集中在某一部門工作，有些要接觸不同部門的主管；到學校實習的則主要在課外活動或暑期班上幫忙，無論如何，他們已親身領悟到工作的基本要點。再者，得到行政主管和資深老師的指導和經驗傳授，這更是他們終身受用的。

經濟轉型中的香港，各行各業不斷在變。例如，中小學在校本管理的使命下，暑期增加了各種的活動。我們的暑期就業培訓也要考慮怎樣去配合新的需要，這方面仍是要各方友好指點的。

數學系暑期交流計劃

過去幾年，本系一直支持優秀本科生及研究生到國內外作暑期交流學習及研究。合作的大學及研究機構包括：UCLA、Lawrence Lab、Berkeley、Cornell University、浙江大學數學系研究所等等。平均每年有10位同學受惠。今年因SARS影響，計劃暫停，明年將繼續舉行。

數學系這份通訊，歡迎您的索取。另外，對數學系的友好及校友的近期，我們十分關心。請通過以下的電郵地址:

newsletter@math.cuhk.edu.hk

告知我們有關索取通訊的詳情或您的近況。謝謝！
Structured matrices occur in many disciplines in applied mathematics and engineering. Fast algorithms for structured matrices are of particular importance in signal and image processing. There were about 60 participants of this conference coming from about 10 different countries.

The Sixth
Pacific Rim
Geometry Conference
December 16-19, 2002
Organized by Profs. Tom Wan and Thomas Au

Sponsored by The Croucher Foundation, The Institute of Mathematical Sciences (CUHK), and The Hong Kong Mathematical Society. The conference attracted more than 65 participants including 15 plenary and 8 contributed speakers. There are slightly more than a half of the participants who are coming from Hong Kong and Mainland China, while the remaining from 8 different countries and regions in the Pacific Rim and overseas.

Up-coming!
International Conference on Parallel Algorithms and Computing Environments (ICPACE)
October 8-11, 2003
Organized by Prof. Jun Zou

Parallel Structure is becoming the main structure of the new generation of high performance computers. Such parallel computers need truly parallel algorithms to bring their efficiencies into full play. The conference is to provide a forum for parallel computing experts, numerical analysts as well as practitioners to exchange and present their research achievements in parallel, computations; algorithms/theories, and parallel environments.

Each year, the Department and the Institute of Mathematical Sciences received many visitors. They come from all over the world and for various period of time, participate in our seminars and sometimes teach courses. Thus, attested the attractiveness and international nature of our programmes. The following is a partial list of them in 2002-03.

Yann Brenier, CNRS, Universite de Nice Sophia-Antipolis (PDE).
Alberto Bressan, Scuola Internazionale Superiore Sopra di
Studi Avanzati - International School for Advanced Studies (PDE).
Luis Caffarelli, University of Texas at Austin (PDE).
Kung-Ching Chang, Peking University (Geometric analysis and PDE).
Cho-Ho Chu, Queen Mary, University of London (Functional
analysis).
John Coates, University of Cambridge (Number theory).
Thierry Coulhon, Universite de Cergy-Pontoise, France (Analysis).
Helene Esnault, University of Essen (Algebraic geometry).
Ai-Hua Fan, Universite de Picardie Jules Verne, France (Probability and fractals).
Benedict H. Gross, Harvard University (Number theory).
King-Fai Lai, University of Sydney (Number theory).
Peter Lax, Courant Institute of Mathematical Sciences, New York University (Analysis and PDE).
Conan N.C. Leung, University of Minnesota (Algebraic geometry).
Fang-Hua Lin, Courant Institute of Mathematical Sciences, New York University (Analysis).
Shanzen Lu, Beijing Normal University (Harmonic analysis).
Alan McIntosh, Australian National University (Harmonic analysis).
Barry Merriman, University of California, Los Angeles (Biological mathematics).
Wei-Ming Ni, University of Minnesota (Nonlinear PDE).
Jiri Rakosnik, Mathematical Institute AS CR, Prague (Functional Analysis).
Jean-Michel Roquejoffre, University of Paul Sabatier - Toulouse, France (Applied mathematics and PDE).
Wilfried Schmid, Harvard University (Algebra).
Zhong-Ci Shi, Chinese Academy of Sciences (Numerical analysis).
Michael Stessin, University at Albany, State University of New York (Analytic function theory).
Eckart Viehweg, University of Essen (Algebraic geometry).
Yang Wang, Georgia Institute of Technology (Analysis, tiling).
Maciej Zworski, University of California, Berkeley (Analysis).