

# Bachelor of Science in COMPUTING MATHEMATICS

## 計算數學理學士



**Professor Ya Yan LU**  
*Head and Professor*

The Department of Mathematics at City University is among the top in the region and has earned remarkable recognition internationally. This is achieved through not only attracting high caliber scholars around the world but also producing outstanding graduates from its full-fledged BSc in Computing Mathematics programme.



**Professor Philippe G. CIARLET**  
*Senior Fellow, HKIAS*

The constant development of new fascinating applications of Mathematics, so far thought to be completely out of reach of mathematical reasoning, combined with the ever-increasing performances of computers, make studying the Mathematics of Computing more exciting and gratifying than ever!



**Professor Stephen SMALE**  
*Senior Fellow, HKIAS*

Studying mathematics can lead to an exciting career. It offers a lifetime of solving fascinating problems. It is a profession which is in demand by every sector of modern society. The computer revolution has intensified this demand.



### MODERN MATHEMATICS

Mathematics is not only an exciting subject in itself, it also has many far-reaching applications in all branches of science and technology. It is also at the heart of numerous modern commercial and industrial activities. During the past decades, mathematics has developed beyond belief. New theories such as chaos, solitons, fractals and wavelets have been introduced. New applications, such as option pricing in finance, X-ray tomography, coding, image and video compression, soliton optical communication, and nuclear waste disposal, are constantly being discovered. Mathematics is an ever-expanding subject. The next decades promise to be as exciting and full of new innovations as the last ones!

### 現代數學

數學不單是一門有趣味的學科，更在各個科技領域裡都有很多重要的應用。它在現代工商業的運作與發展中經常起著關鍵性的作用。在過去數十年，數學的發展超乎想像。新的理論如混沌理論、孤立子理論、分形理論及小波理論等都陸續創立；新的應用領域如金融上的期權定價、X射線斷層掃描、編碼、影像壓縮、光纖通訊及核廢料處理等都被開發出來。數學是一門不斷成長及發展的學科，未來的數十年與過去的數十年相比，必定會是更加激動人心和充滿創意的。



### DEPARTMENT OF MATHEMATICS

The Department specialises in applied and computational mathematics. Undergraduate teaching is backed up by extensive research on a wide range of topics. This places us in close contact with many modern uses of mathematics. Our programme is both relevant and up-to-date.

We are proud of our academic staff, many of whom are internationally renowned scholars. For example, Professor Stephen Smale, member of the U.S. National Academy of Sciences, and winner of a Fields Medal (which is the highest achievable honour in mathematics, comparable to a Nobel Prize) and a Wolf Prize, was Distinguished University Professor in the Mathematics Department from 1995 to 2001. Professor Philippe G. Ciarlet, member of the French Academy of Sciences and of seven other academies, was Chair Professor of the Department until August 2011. He joined the office of the College of Science and Engineering in September 2011 as University Distinguished Professor. Professor Ciarlet has received numerous distinctions, among which a Grand Prize of the French Academy of Sciences and an Alexander von Humboldt Research Award.

Professor Smale and Professor Ciarlet are currently Honorary & Emeritus Professors in the Department.

### 數學系

本系專長於數學的實際應用及計算，系內同仁廣泛而深入的研究為良好的教學提供了紮實的基礎，教學內容緊密地聯繫現代數學的應用。我們的數學課程既緊貼時代發展，又具有實際運用價值。

本系的教員令我們深感自豪，當中不乏享譽國際的學者。如美國國家科學院院士、菲爾茲獎（數學界中相當於諾貝爾獎的最高榮譽獎項）及沃爾夫獎得主 Stephen Smale 教授，就是本系一九九五至二零零一年間的傑出大學教授。二零零九年八月 Smale 教授重返城大出任大學傑出教授。法國科學院兼另外七間學院院士 Philippe G. Ciarlet 教授，曾任本系講座教授至二零一一年八月，九月開始出任科學及工程學院大學傑出教授。Ciarlet 教授獲頒多個獎項，其中包括法國科學院的法國科學大獎及洪堡研究獎。

Smale 教授及 Ciarlet 教授現為香港城市大學數學系的榮休教授。



## MAJOR AIMS

The Bachelor of Science in Computing Mathematics programme was introduced in 1994. This major is unique in Hong Kong. It emphasizes the balance between theories and their applications to practical problems, with a special focus on applied mathematics linked to computational aspects.

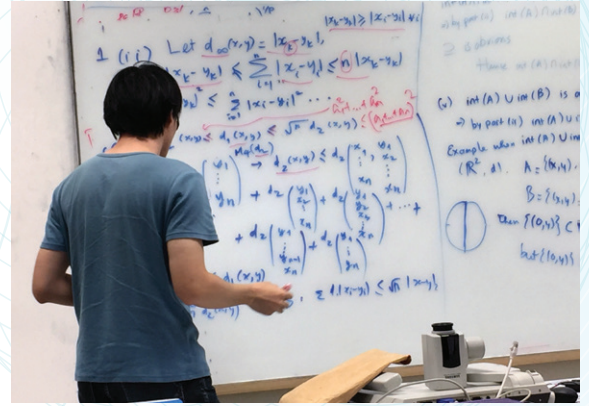
The major aims at equipping students and producing graduates with a strong background in:

- data analysis
- mathematical modelling
- scientific computing
- technical computer software

Students are trained to think quantitatively and analyse problems critically.

## 主修課程主旨

計算數學理學士課程於一九九四年開辦，著重理論和應用數學的平衡，尤其是與科學計算之關連。本課程旨在為學生在數據分析、數學模型、科學計算及專業軟件方面建立鞏固的學術根基，同時為學生提供數量思考與分析解難能力的培訓。



## EXCHANGE OPPORTUNITIES

The Department of Mathematics strongly supports and encourages students to join outbound exchange programmes to widen their horizon and enrich learning experiences. Students can participate in the student exchange programmes from their second to fourth year of studies.

## 海外交換生機會

數學系非常支持及鼓勵學生於在學第二至四年，參加海外交換生計劃，以擴闊學生視野及豐富學習經驗。

### University of Wisconsin-Madison, USA

"It was really a fantastic experience for me to go abroad and be an exchange student.... the academic atmosphere made me find the motivation for learning;...

It was the first time that I began to understand the true meaning of cultural blending, to respect their traditions, to learn their manners behaving in a way different from that we got used to, to exchange stories in each others' own countries and see how diversified this world is."

**Miss Biyue HUANG/BSCM**



### University of Mannheim, Germany

"It was a marvelous journey of self-discovery to support personal growth and a straight forward path to become familiar with diverse cultures. I had come out of my shell speaking in German every day.

Language barrier is not a serious problem because the majority of workers are able to speak in English.... It is also highly recommended to study in Mannheim for competitive students who like challenges in an international environment because most of the classmates are the elite around the world. The fantastic teaching atmosphere provides more room for students to think outside the box. Meanwhile, classmates you know here might be your business partners in the future career."

**Mr Lucas S K MAK/BSCM**





## CURRICULUM STRUCTURE

## 課程結構

Students are required to complete 121 credit units in different courses. Cores cover the followings:

學生必須在不同的學科內完成一百二十一個學分。主要的學科包括：

- |                                       |  |             |            |
|---------------------------------------|--|-------------|------------|
| • Analysis                            | • Introduction to Optimization                 | • 分析        | • 最優化導論    |
| • Applied Analysis                    | • Java Programming                             | • 應用分析      | • 編程語言     |
| • Applied Statistics                  | • Linear Algebra                               | • 應用統計      | • 綫性分析     |
| • Complex Analysis                    | • Multi-variable Calculus                      | • 複變函數      | • 多變量微積分   |
| • Computing Mathematics Laboratory    | • Numerical Methods for Differential Equations | • 計算數學實驗    | • 數值微分方程方法 |
| • Data Structures and Data Management | • Ordinary Differential Equations              | • 數據結構和數據管理 | • 常微分方程    |
| • Discrete Mathematics                | • Partial Differential Equations               | • 離散數學      | • 偏微分方程    |
| • Elementary Numerical Methods        | • Probability and Statistics                   | • 基本數值方法    | • 概率及統計學   |

Students also need to satisfy the university requirements in language and Chinese civilization. The curriculum is very flexible. The university requirement for gateway education and free electives give students opportunities to develop their own interests in other subjects.

此外，學生亦須符合大學對語言及中國文化方面的統一要求。本課程極具靈活性，通過大學對選讀精進教育科目及自由選科的要求，為學生提供機會以發展他們在其他學科領域裡的興趣。



### Korea Advanced Institute of Science and Technology, Korea

"Exchange is not a year in your life, but a life in one year." I didn't quite get the meaning of this sentence until I joined the exchange program myself. During this four-month exchange life in South Korea, I have experienced much more than I could ever expect.... I am no longer a stranger as I first arrived. I have adapted to the new life, become good friends with those people and I can even communicate with local people in Korean... Thanks to the exchange program, I have become more independent and mature, developed intercultural knowledge, and more importantly had friends all around the world. I recommend everyone to join the exchange program and I am sure this will become a treasure in your life."

Miss Diqian HUI/BSCM



### University of Toronto, Canada

"...it was a really great experience for learning about the teaching system abroad and practicing English. It really broadened my vision and gave me an opportunity to know another world. It also made me think about the teaching and learning environment in Canada and let me think about my future in choice of graduate school. I appreciate the chance to explore the world in my youth as Ostrovsky said, youth should be "full of power, full of expectation for voluntary, full of knowledge and the aspirations of the struggle, filled with hope and confidence"."

Miss Siyu ZHANG/BSCM





## INTERNSHIP OPPORTUNITIES

The major provides internship opportunities for our students to work in local firms and overseas universities during the summer of their third-year studies. Students may join the Industrial Attachment Scheme (IAS) to work in local firms. For the Overseas Internship Scheme (OIS), students take part in research projects conducted in overseas universities.

## 專業實習機會

此課程提供工作實習機會予學生，讓他們在第三年暑期到本港機構參與暑期工作培訓計劃或到海外大學參加工作實習計劃。



## CAREER PROSPECTS / FURTHER STUDIES

As graduates of our programme, they are in hot demand in a number of fields, including data analysis, business intelligence analysis, mathematical modelling, quantitative business planning, scientific programming. There is also a demand for mathematics teachers in Hong Kong secondary schools. In recent years, about 10% of our graduates found jobs in intelligent business units of major banks in Hong Kong.

Apart from joining the workforce, some of our graduates further their studies locally or in overseas universities, such as University of Cambridge and University of Oxford in UK, University of Toronto in Canada, and Harvard University, Yale University, New York University, University of Chicago, Universities of California, Georgia Institute of Technology, and Brown University in the US, ETH Zurich in Switzerland, and National University of Singapore in Singapore.

## 前途展望

作為本課程之畢業生，在就業市場上將成為各行各業吸納及羅致的對象，包括數據分析、商業智能分析、數學模型、量化商業計劃、科學程式編排等。畢業生亦同時為香港各中學對數學科教師的需求提供人力資源。近年約百份之十的本科畢業生成功被本地主要銀行吸納於其智能商貿部門一展所長。

除了開展職業生涯，部份畢業生在本地或海外繼續升學，例如：英國劍橋大學及牛津大學，加拿大多倫多大學，美國哈佛大學、耶魯大學、紐約大學、芝加哥大學、加州大學、喬治亞理工學院及布朗大學，瑞士蘇黎世聯邦理工學院，以及位於新加坡的新加坡國立大學等。



## ENTRANCE REQUIREMENTS

Applicants with Hong Kong Diploma of Secondary Education (HKDSE) (for 2025 Entry)

In addition to the General Entrance Requirements of the University, candidates must satisfy the following programme-specific entrance requirements:

- Level 3 or above in English Language, Chinese Language and Mathematics Compulsory Part;
- Attained in Citizenship & Social Development; AND
- Elective 1

Level 3 or above in one elective subject from:

- Mathematics Extended Part (Module 1 or 2)
- Physics
- Chemistry
- Biology
- Business, Accounting and Financial Studies (Accounting or Business Management)
- Information and Communication Technology

- Elective 2

Level 3 in any elective subjects

## 入學條件

香港中學文憑 (HKDSE) 考試申請者 (2025 年入學)

除大學一般入學條件外，申請者必須符合以下數學系入學要求：

- 英國語文、中國語文及數學必修部分第三級或以上，及
- 公民與社會發展科達，及
- 選修科目一
  - 下列其中一個科目第三級或以上：
    - 數學延伸部分（單元一或二）
    - 物理
    - 化學
    - 生物
    - 企業、會計與財務概論（會計或商業管理）
    - 資訊及通訊科技
- 選修科目二
  - 任何選修科目第三級或以上

## ENQUIRIES 查詢

Phone 電話: (852) 3442 8643

Fax 傳真: (852) 3442 0250

Email 電郵: [mabscm@cityu.edu.hk](mailto:mabscm@cityu.edu.hk)

Website 網址: <http://www6.cityu.edu.hk/ma/ug/bscm.htm>

