

## DEPARTMENT OF MATHEMATICS

### The 16<sup>th</sup> Epsilon Fund Award to Top Students

The Epsilon Fund Award was established in 2006 with donations from faculty of the Department of Mathematics, and from the departmental fund to honor excellent students: undergraduates and postgraduates who excel in mathematical scholarship and research. One hundred and twenty-one students have been awarded since its establishment. This year sixteen students receive the award while thirteen students obtain honourable mention. Each of them possesses a very high cumulative grade average, especially in mathematics subjects, and some have received multiple graduate program offers from famous universities.

### Twelve Mathematics students receive the Epsilon Fund Award

#### Four postgraduates:

#### 1. Jingming WANG (Year 4; PhD)

王 经 铭：四年級哲學博士(數學) 研究生

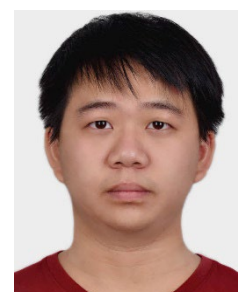
Jingming was admitted to HKUST in 2017 via the Hong Kong PhD Fellowship Scheme (HKPFS). Currently a final-year student pursuing the Doctor of Philosophy in Mathematics degree, Jingming is not only an effective tutor but she also excels brilliantly in research. Her thesis supervisor Professor Zhigang BAO said, “Jingming has been working on large dimensional random matrices, with a focus on the spiked sample covariance matrix, which is a fundamental model in mathematical statistics. A particularly important problem of this model is the limiting behaviour of the leading eigenvalues and eigenvectors. Although the eigenvalue part has been well studied in the literature, the result about eigenvector is far less. Together with her collaborators, Jingming has established a complete limiting theory of the eigenvectors of the spiked covariance matrix. Jingming is also working on other problems such as the spectral theory of the covariance matrices for missing data, and Neymann-Pearson classification under high-dimensional setting. She has also obtained important results for these topics.” Jingming won twice the first class of the Din-Yu Hsieh Teaching Award. She has obtained grade A/A+ in nearly all mathematics courses. She enjoys studying MATH6450C (Random Matrix theory) the most because it introduces the most fundamental knowledge and techniques in random matrix theory. “Stay curious and always ask yourself why. Keep a positive attitude and concentrate on your research problems. Improve scientific writing skills intentionally” are Jingming’s advocates for research excellence. Jingming will soon be a Postdoctoral Fellow at Harvard University in the Department of Statistics after she graduates from HKUST.



#### 2. Xusheng DU (Year 3; PhD)

杜 旭 笙：三年級哲學博士(數學) 研究生

Xusheng is currently a third-year student pursuing the Doctor of Philosophy in Mathematics under the supervision of Professor Tianling JIN. Xusheng has achieved excellently in research undertakings and is highly commended by Professor Jin. “During the past year, Xusheng published one paper in the Journal of Differential Equations on the arbitrarily large blow up solutions to Q-curvature equations. He also has a paper under revision in the journal Calculus of Variations and PDEs on positive solutions of higher order conformally invariant equations with a singular set. His performance in the past year is excellent. He has my strongest possible support for the epsilon fund award,” said Professor Jin. Xusheng has obtained grade A/A+ in nearly all mathematics courses. Among these courses, his favourite course is MATH 5281 (Partial Differential Equations). To strive for academic excellence, Xusheng believes students should always be patient with the project and draw courage and inspiration from classic papers when encountering difficulties.



### 3. Xiacong XU (Year 2; PhD)

许晓淙：二年級哲學博士(數學) 研究生

A research student of Professor Kun XU, Xiacong is now in his second year of study pursuing the Doctor of Philosophy Degree in Mathematics. Xiacong got A+/A in almost all mathematics courses and progresses promisingly in his research. Professor Xu speaks highly of Xiacong, “Even though this is his second year at HKUST, he showed super research capability and made excellent achievement. In the past two years, Xiacong has been working on the multiscale modeling and computation. More specifically, he has been working on the non-equilibrium modeling for diatomic gas and acceleration techniques for the steady state solution. For the diatomic gas, he included the translational-rotational non-equilibrium modeling into the unified gas-kinetic wave particle method in the study of hypersonic rarefied flow. The method becomes one of the most accurate and efficient one in both rarefied and continuum flow regimes. For the steady state calculation, he designed two steps implicit iterative method with the inclusion of multigrid technique. The efficiency of the unified gas-kinetic scheme has been improved by several order of magnitude and the scheme becomes the state of art method for the steady state flow simulation. In the past year, he has finished three papers, one is published, one is on the second round review and (will be accepted soon), and the third one is on review.” Xiacong shares his tip for achieving academic excellence. He says, “In the early stages of academic research, learn more mathematics knowledge in your field. These knowledge may be helpful for your future research.”



### 4. Jia ZHAO (Year 2; PhD)

赵佳：二年級哲學博士(數學) 研究生

Jia won the Hong Kong PhD Fellowship Scheme (HKPFS) in 2019 and was admitted to the Department of Mathematics at HKUST pursuing the Doctor of Philosophy Degree under the supervision of Professor Can YANG. She studies machine learning, optimization probability, and statistical inference, and has obtained grade A/A+ in all mathematics courses. Jia’s research focuses on the development of statistical and machine learning methods for largescale data analysis, including causal inference with genetic data, and deep learning methods for integrating single-cell data. As a year-two PhD student, she has published one paper in the top journal as the first author and finished one manuscript as the co-first author. She has also contributed two manuscripts as co-authors, under review in PNAS and Nature Communications. Her first paper “Bayesian Weighted Mendelian Randomization for Causal Inference based on Summary Statistics” was published in Bioinformatics (impact factor, 5.61) and ranked as 3 out of 59 in the field of mathematics and computational biology. Since its publication in 2020, this paper has been cited 12 times as of May 2021. Now she is leading the development of statistical methods for spatial transcriptome data analysis. “I am very proud of having Jia as my PhD student. I believe Jia will make her fundamental contributions to science by leveraging her solid mathematical skill,” remarked Professor Yang who highly speaks of Jia. Jia won the First Class of the 2020 Din Yu Hsieh Teaching Award. “Be curious and gain hands-on experience” is Jia’s advice on ways to achieve research excellence.



## Twelve undergraduates:

### 5. Mingyun HU (Year 4; AM)

胡 銘 允：四年級理學士(數學)- 應用數學本科生

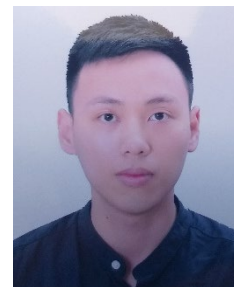
Mingyun is our final-year student pursuing the Bachelor of Science (Mathematics) Degree in Applied Mathematics Track. He has a great passion for applied mathematics. He gets grade A/A+ in most of his mathematics courses. Among all the courses that Mingyun has taken, he enjoys MATH 4023 (Complex Analysis) taught by Professor Frederick Fong the most. He received the Dean List's Award in fall and spring semesters in 2018-2019, spring semester in 2019-20 and fall semester in 2020-21. Mingyun is fond of undertaking research work. He received a number of research funds like the Research Stipend from HKUST Fok Ying Tung Research Institute, the UROP Support Research Grant for Spring 2020 and the Research Stipend for UROP1000. Regarding the advice on achieving academic excellence, Mingyun believes one should "find and maintain a proper learning pace; arrange the time in advance and avoid being a 'deadline fighter'; solve problems in time and do not let them pass easily; do not hesitate to seek help from instructors when facing any difficulties in study, and keep a positive attitude even facing some failures." After graduation, Mingyun will pursue the Master of Philosophy in Mathematics Degree at HKUST.



### 6. The Hoan NGUYEN (Year 4; PMA)

四年級理學士(數學)- 純粹數學高級班本科生

The Hoan is in his final year pursuing the Bachelor of Science (Mathematics) Degree in Pure Mathematics (Advanced) Track. Before joining HKUST, he took part in the International Mathematical Olympiad 2014 and 2015, and won Gold Medals in both years. At HKUST, he was awarded the Dean's List Award, the Chern Class Talent Scholarship, the University Scholarship and the School of Science Exchange Scholarship to Northwestern University in the United States due to his outstanding academic results. The Hoan's advice on achieving academic excellence is that we should always try to read and understand all the proofs of theorems, propositions and lemmas in textbooks thoroughly. "I always feel more comfortable learning new materials and doing old homework once I fully understood how other mathematicians came up with the theorems", advocated by The Hoan in his study. The Hoan gets remarkably good results in his mathematics courses. Among such nineteen courses of grade A+, he enjoys MATH4033 (Calculus on Manifolds) the most. He also works with Professor Frederick FONG on UROP and Capstone Project on differential geometry. After his graduation from HKUST, The Hoan will begin his Ph.D. in Mathematics at University of Chicago studying Differential Geometry with full scholarship. He also gets Ph.D. offers from University of California, Berkeley, Rutgers University, University of Notre Dame, University of British Columbia and University of Wisconsin Madison.



### 7. Dajun SUN (Year 4; IRE)

孫 大 鈞：四年級理學士(數學)- 國際科研本科生

Dajun is our final-year student doing double majors. The elite IRE (International Research Enrichment) program is his primary major program of study, and Computer Science program is his second major. He also registers a minor program in Chemistry. Being outstanding academically, Dajun obtains grade A/A+ in almost all mathematics and computer science courses. He was awarded the University Scholarship Scheme for Continuing Undergraduate Students, the Dean's List Award, the Chern Class Talent Scholarship and the Chern Class Achievement Scholarship. "Just pay effort and enjoy yourself" is the motto advocated by Dajun in his study. Among all courses that Dajun has taken, he is particularly interested in the honor series, MATH1023 (Honors Calculus I), MATH1024 (Honors Calculus II), MATH2043 (Honors Mathematical Analysis), MATH3043 (Honors Real Analysis), MATH2131 (Honors in Linear and Abstract Algebra I) and MATH2431 (Honors Probability). Dajun will pursue PhD study at HKUST after graduation. He also gets a master offer from University of Chicago.



### 8. Wai Jing TSOI (Year 4; MAEC)

蔡 韋 婧：四年級理學士(數學與經濟)本科生

Wai Jing is a final-year student pursuing the Bachelor of Science Degree in Mathematics and Economics. She also declared a minor program in Actuarial Mathematics. Wai Jing is outstanding academically. She gets grade A/A+ in most of the mathematics courses, and eight of them are of A+. MATH4512 (Fundamentals of Mathematical Finance) is the mathematics course that Wai Jing enjoys study the most because she can learn how to use mathematics tools to solve finance problems in real life. She also enjoys doing an independent study project in MATH4984K (Independent Study) with Dr. Chi Man LEUNG because it deepens her understanding in other mathematics courses. Wai Jing is the recipient of several scholarships, including the AEON Credit Service Scholarship, the University's Scholarship Scheme for Continuing Undergraduate Students and the Dean's List Award. She went for study exchange to Rice University in the United States supported by the HKSAR Government Scholarship Fund–Reaching Out Award. “Study hard, and party hard” is Wai Jing's tips in achieving academic excellence. She gets Master offers from Columbia University, University of Chicago, and University of Cambridge.



### 9. Xuan Trung VU (Year 4; PMA)

四年級理學士(數學)- 純粹數學高級班本科生

Xuan Trung is a final-year student pursuing the Bachelor of Science (Mathematics) Degree in Pure Mathematics (Advanced) Track. He performs outstandingly in mathematics courses throughout his years of study. He gets remarkably good results in mathematics courses. Among the twenty-six mathematics courses that he took, eight are at postgraduate level, and nearly all courses receive grade A or above. Specifically, Xuan Trung obtains grade A+ in eighteen mathematics courses, and among which four are at postgraduate level. Impressed by Xuan Trung's excellent academic results, the University has offered him a number of scholarships which include the HKSAR Government Scholarship, the University Scholarship, the Chern Class Talent Scholarships, and the Dean's List Award. Xuan Trung went for study exchange to University of Waterloo, Canada supported by the School of Science Exchange Scholarship in spring 2019-2020. After graduation, Xuan Trung is going to start a new study life at University of Yale in the United States. He will pursue Doctor of Philosophy Degree in Mathematics.



### 10. Dehao YUAN (Year 4; MAEC)

袁 德 昊：四年級理學士(數學與經濟)本科生

Dehao is a final year student doing double majors. His primary program of study is Bachelor of Science Degree in Mathematics and Economics while his second program of study is the Bachelor of Science Degree in Data Science and Technology. Dehao is the awardee of the Chern Class Scholarship and the University Scholarship Scheme for Continuing Undergraduate Students due to his excellent academic results. Dehao has achieved grade A/ A+ in numerous mathematics and data science-related courses, of which he gets A+ in seven mathematics courses. The two mathematics courses that Dehao enjoy learning the most are MATH2431 (Honors Probability) and MATH4023 (Complex Analysis). “Think before doing. Don't complicate things” is Dehao's advice on achieving academic excellence. Dehao is planning to pursue a Doctor of Philosophy Degree in Computer Science at University of Maryland. He also gets offer from Carnegie Mellon University.



### 11. Hong-yuan CHANG (Year 3; DSCT)

張宏遠：三年級理學士(數據科學與技術)本科生

Hong-yuan is our third-year student pursuing the Bachelor of Science in Data Science and Technology. Hong-yuan achieves outstandingly in study. He obtains grade A/A+ in all computer science and mathematics courses. His cumulative grade point average is over point 4. He is awarded the University's Scholarship Scheme for Continuing Undergraduate Students and the Dean's List Award. Among all courses that Hong-yuan has taken, he is particularly fond of MATH2421 (Probability) because the instructor makes the content interesting and easy to understand. Hong-yuan's tips for academic success are first, to preview and review before and after each class which will make learning more efficient.; second, to take number of courses that one can handle each semester, and spend enough time on each of them; and last but not the least, to try to find motivation for taking the course. Having motivation can prevent one from giving up when facing difficulties. Hong-Yuan opines that if at the first glance, the subject seems boring, one should try to deceive oneself thinking it is interesting. "Fake it till you make it!" and eventually one will get through the boring process.



### 12. KA Ho HONG (Year 3; MAEC)

康嘉皓：三年級理學士(數學與經濟)本科生

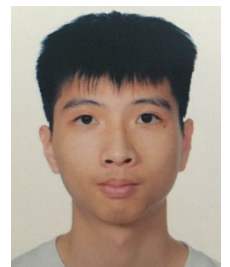
Ka Ho is a third-year student in the program of Bachelor of Sciences Degree in Mathematics and Economics. In Ka Ho's viewpoint, the key to academic excellence is to follow the principle that "Don't wait until the last-minute". He advises that students should be disciplined to review the course materials on a regular basis. It would be the best if they can revise them after each lesson, so they can better understand the next lecture and spare enough time to digest those abstruse concepts through doing exercises before the midterms and finals. Ka Ho gets grade A/A+ in all mathematics courses. He enjoys learning MATH4512 (Fundamentals of Mathematical Finance) the most because it provides a good illustration of how we can use scientific methods to deal with investment and finance problems. Financial Mathematics is the most intriguing area of mathematics for him to link his math knowledge to real life applications. Ka Ho is awarded the Joseph Lau Luen Hung Charitable Trust Scholarship, the Dean's List Award and the AEON Credit Service Scholarship because of his outstanding academic results.



### 13. Ka Hong LI (Year 3; IRE)

李嘉康：三年級理學士(數學)- 國際科研本科生

Ka Hong is currently our third-year student in the elite IRE (International Research Enrichment) program. Being outstanding academically, he obtains A/A+ in sixteen mathematics courses all through his years of study at HKUST. He is the recipient of a number of University awards such as the University Scholarship, the Chern Class Scholarship, AEON Credit Service Scholarship and the Dean's List award. Ka Hong enjoys learning MATH1023 (Honors Calculus I) the most because this was his first time he did math "rigorously". He found that he really enjoy giving rigorous proof using epsilon-delta language, which was completely new to him at that time. To achieve academic excellence, Ka Hong suggests we can always draw a picture to illustrate what is going on whenever possible. Before taking examinations, we should try to do past papers exactly 24 hours before the exam starts so that we can tune our biological clock and our brain works best at that time slot.



#### 14. Lingchong LIU (Year 3; PMA)

刘凌翀：三年級理學士(數學)- 純粹數學高級班本科生

Lingchong is a third-year student in the program of Bachelor of Science (Mathematics) Degree in Pure Mathematics (Advanced) Track. Lingchong scores high in the mathematics courses. He obtains grade A/A+ in eighteen mathematics courses, and among which two are at postgraduate level. Lingchong particularly enjoys studying MATH4033 (Calculus on Manifolds) because it provides profound insights and shows the essence of theorems that he learnt in MATH2023 (Multivariable Calculus). Being outstanding academically, Lingchong is awarded a number of scholarships which include the University Scholarship for continuing students, the Dean's List Award and the Chern Class Talent Scholarship. "Understanding the concepts is always the most important thing", and then "I would try to find connections between concept intuition or insights behind the theorems". This is the advice given by Lingchong on achieving academic excellence.



#### 15. Albert John Lalim PATUPAT (Year 3; DSCT)

三年級理學士(數據科學與技術)本科生

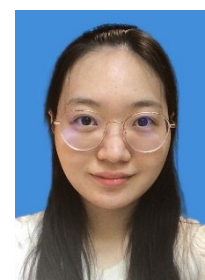
Albert John Lalim is doing double majors. Being a year-three student now, he is pursuing the Bachelor of Science Degree in Data Science and Technology which is his first major program of study, and Computer Science program is his second major. Albert John Lalim is a well-rounded student. He has got A+ in twelve out of thirteen mathematics courses that he has taken. He has also got nearly all A+ in his computer courses as well. His cumulative grade point average reaches over point 4 throughout all semesters of study. Albert John Lalim is particularly fond of MATH2431 (Honors Probability) and MATH4983Z (High-Dimensional Probability in Data Science) because he likes studying probability, both theory and applications. Albert John Lalim receives the HKSAR Government Scholarship, the University Scholarship, the Chern Class Scholarship and the Dean's List Award. He also won a Gold Metal in International Mathematical Olympiad 2018, and 8<sup>th</sup> place in 2018 and 7<sup>th</sup> place in 2019 in the Simon Marais Mathematics Competition. It is curiosity that drives Albert John Lalim to achieve academic excellence. He advises that we should always be curious and let this curiosity drive us to explore and learn anything.



#### 16. Ruirui WU (Year 3; PMA)

吴瑞瑞：三年級理學士(數學)- 純粹數學高級班本科生

Ruirui is our third-year student taking dual major programs. She is now pursuing the Bachelor of Science (Mathematics) Degree in Pure Mathematics (Advanced) Track as her first major, and the Computer Science as her second major. Ruirui has obtained A/A+ in nearly all mathematics courses. She enjoys studying MATH4023 (Complex Analysis) the most because it is a nice introductory course to complex analysis, showing its beauty in a clear and smooth way. Ruirui's advice on achieving academic excellence is that we should find our passion and strength. It is also good to communicate and discuss more with classmates and teachers. She receives several scholarship award, such as the University Scholarship, the Chern Class Scholarship, the University Scholarship Scheme for Continuing Undergraduate Students, the Chern Class Talent Scholarship and the Dean's List Award. Ruirui also participants actively in a UROP project under the supervision of Professor Frederick FONG.



## Thirteen Mathematics students receive Honorable Mention

**1. Ziwei CHEN**

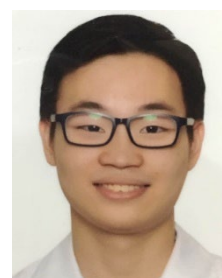
(UG Year 4; MAEC) *left photo*

**2. Yui Chi HUNG**

(UG Year 4; MATH-IRE) *middle photo*

**3. Sedrick Scott So KEH**

(UG Year 4; DSCT) *right photo*



**4. Chih-yu LEE**

(UG Year 4; DSCT) *left photo*

**5. Jiaqi REN**

(UG Year 4; MAEC) *middle photo*

**6. Ruoheng SHENG**

(UG Year 4; MAEC) *right photo*



**7. Yusen XIA**

(UG Year 4; MATH-IRE) *left photo*

**8. Zhihao XIAO**

(UG Year 4; MAEC) *middle photo*

**9. Ce BIAN**

(UG Year 3; MAEC) *right photo*



**10. Van Quyet DO**

(UG Year 3; DSCT) *left photo*

**11. Hyungmin LIM**

(UG Year 3; DSCT) *right photo*



**12. Wemp Santiago PACHECO RODRIGUEZ**

(UG Year 3; MATH-IRE) *left photo*

**13. Chun Ho PANG**

(UG Year 3; MATH-CS) *right photo*

