

Curriculum Vitae

Name: Tuen Wai NG, Patrick

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Current Address: Department of Mathematics, The University of Hong Kong, Room 408, Run Run Shaw Building, Pokfulam Road, Hong Kong.
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Education And Qualifications:

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|--------------------|---|
| 1990 – 1993 | The University of Hong Kong, B.Sc. (Math) |
| 1993 – 1995 | The Hong Kong University of Science and Technology, M.Phil. (Math) |
| 1995 – 1998 | The Hong Kong University of Science and Technology, Ph.D. (Math) |
| 1998 – 2000 | University of Cambridge, Croucher Foundation Research Fellow |
| 2000 – 2002 | The University of Hong Kong, Postdoctoral Fellow |
| 2002 – 2008 | The University of Hong Kong, Assistant Professor |
| 2003 – 04 (summer) | Tsinghua University, Senior Visiting Scholar |
| 2007 (spring) | Purdue University, Visiting Assistant Professor |
| 2008 – 2015 | The University of Hong Kong, Associate Professor |
| 2009 – 2011 | The University of Hong Kong, Deputy Head of Department of Mathematics |
| 2015 – | The University of Hong Kong, Professor |

Research Interest:

Complex analysis and its applications, game theory and mathematical biology. In particular, factorizations of meromorphic functions, complex dynamics, complex differential equations and geometry of polynomials and finite Blaschke products, voting theory, epidemic modelling and biological sequence analysis.

Teaching Experiences

1. Teaching Assistant, The Hong Kong University of Science and Technology (1993-1997)
2. Teaching Assistant Coordinator, The Hong Kong University of Science and Technology (1997-1998)
3. Tutor, University of Cambridge (1999-2000)
4. Lecturer, The University of Hong Kong (2000-)
5. Lecturer, Purdue University (2007, Spring semester)

Courses Taught:

MATH1801 Mathematics for Physical Sciences I;
MATH1802 Mathematics for Physical Sciences II;
MATH0806 Mathematics for Social Sciences;
MATH2001 Development of Mathematical Ideas;
MATH2303 Matrix Theory and Its Applications;
MATH1811 Mathematics I;
MATH1812 Mathematics II;
MATH0011 Number and Patterns in Nature and Life;
MATH2911 Game Theory and Strategy;
MATH3002 Mathematics Seminar;
MATH3403 Functions of a Complex Variable;
MATH4910 Senior Mathematics Seminar;
YSCN0016 Games and the Mathematical Mind;
YSCN0031 Every Day Mathematics;
YSCN0034 Hidden Order in Daily Life: A Mathematical Perspective;
MATH6101 Intermediate Complex Analysis;
EAM04 Numbers and Patterns: Quantitative Reasoning and Mathematical Thinking;
CCST9017 Hidden Order in Daily Life: A Mathematical Perspective

Current Research Students:

Pan Shun Lau(Ph.D., [co-supervise with Dr. N.K. Tsing])
Jiaxing Huang(Ph.D.)
Chung Tak Chiu, Kenneth (MPhil.)

Students Supervised/Co-supervised:

Chengfa Wu (Ph.D., 2014)
Pak Leong Cheung (M.Phil., 2011, Ph.D., 2014)
Chiu Yin Tsang (M.Phil., 2008, Ph.D., 2012)
Wong Kwok Kin (M.Phil., 2012)
Liang Xu (M.Phil., 2010)
Yiu Fai Lee (M.Phil., 2006, Ph.D., 2010 [co-supervise with Prof. Pak Shum])
Mingxi Wang (M.Phil., 2007)
Tsz Lung Chan (M.Phil., 2007)
Ching Wan Tai (M.Phil., 2007 [co-supervise with Dr. N.K. Tsing])
Yan Yu Choi (M.Phil., 2006)

Awards

1. Sir Edward Youde Memorial Scholarship (1989)
2. Croucher Foundation Research Fellowship (1998)
3. Outstanding Services Award from Department of Mathematics, The Hong Kong University of Science and Technology (1998)
4. Outstanding Young Researcher Award, The University of Hong Kong (2006)
5. Award for Service Contribution 2010-11, Faculty of Science, The University of Hong Kong (2011)
6. Faculty Knowledge Exchange Award, The University of Hong Kong (2012)

Research Grants

1. Factorization and complex dynamics of meromorphic functions and related topics (2003) [HK\$ 411000, Competitive Earmarked Research Grants (CERG)].
2. D-Companion Matrices and Geometry of Polynomials (2005)[HK\$ 231000, Competitive Earmarked Research Grants (CERG)].
3. A double epidemic model for SARS propagation (2003) [HK\$43500, Small Project Funding from HKU].
4. Exact solutions of algebraic differential equations (2005) [HK\$ 28400, France/Hong Kong Joint Research Scheme - Travel Grants].
5. Meromorphic solutions of algebraic differential equations (2007) [HK\$ 445000, Competitive Earmarked Research Grants (CERG)].
6. Factorizations and iterations of meromorphic functions and related topics (2009) [HK\$ 312,000, Competitive Earmarked Research Grants (CERG)].
7. Smale's inequalities for polynomials and related problems (2011) [HK\$ 650,000, Competitive Earmarked Research Grants (CERG)].
8. Vector valued Nevanlinna theory and systems of algebraic differential equations (2011) [HK\$ 43,200, France/Hong Kong Joint Research Scheme - Travel Grants].
9. Meromorphic mappings and their applications to related problems in number theory and differential equations (2013) [as a co-investigator, RMB\$ 500,000, NSFC grant 11271227].
10. Zero distributions of derivatives of polynomials: deterministic and random (2013) [HK\$ 592,987, Competitive Earmarked Research Grants (CERG)].
11. Fermat-type functional equations and the method of jet differentials (2015) [HK\$ 451,255, Competitive Earmarked Research Grants (CERG)].

Publications

Research papers:

1. T.W. Ng and C.C. Yang, Certain criteria on the existence of a transcendental entire common right factor. *Analysis* **17** (1997), no. 4, 387-393.
2. T.W. Ng and C.C. Yang, On the zeros of $\sum a_i \exp g_i$. *Proc. Japan Acad. Ser. A Math. Sci.* **73** (1997), no. 7, 137–139.
3. T.W. Ng and C.C. Yang, On the common right factors of meromorphic functions. *Bull. Austral. Math. Soc.* **55** (1997), no. 3, 395–403.
4. T.W. Ng and C.C. Yang, On the composition of a prime transcendental entire function and a prime polynomial, *Pacific Journal of Mathematics* **193** (2000), no. 1, 131-141.
5. A.F. Beardon and T.W. Ng, On Ritt's factorization of polynomials, *Journal of London Mathematical Society*, **62** (2000), no. 1, 127-138.
6. T.W. Ng, An example concerning infinite factorizations of transcendental entire functions, *Expositiones Mathematicae* **18** (2000), no. 2, 127-130.
7. T.W. Ng, Recent progress on the unique factorizations of entire functions, *Proceedings of the Second International ISAAC Congress, Vol.2, 1187-1199*, Kluwer Academic Publishers, 2000.
8. T.W. Ng, Permutable entire functions and their Julia sets, *Mathematical Proceeding of Cambridge Philosophical Society* **131** (2001), no.1, 129-138.
9. T.W. Ng, Imprimitve parametrization of analytic curves and factorizations of entire functions, *Journal of London Mathematical Society*, **64** (2001), no.2, 1-10.
10. A.F. Beardon, D. Minda and T.W. Ng, Smale's mean value conjecture and the hyperbolic metric, *Mathematische Annalen* **322** (2002), 623-632.
11. A.F. Beardon, T.K. Carne and T.W. Ng, The critical values of a polynomial, *Constructive Approximations*, **18** (2002), 343-354.
12. W.K. Ching, S.K. Chung, Y.K. Lau, T.W. Ng and S.P. Yung, A Vector-host Epidemic Model, *International Mathematical Journal*, pp. 751-755, Vol.2, 2002.
13. T.W. Ng, Smale's mean value conjecture for odd polynomials, *Journal of Australia Mathematical Society*, **75** (2003), no. 3, 409–411.
14. T.W. Ng, Gabriel Turinici and Antoine Danchin, A Double Epidemic Model for the SARS Propagation, *BMC Infectious Diseases* **3** (2003).
15. W.K. Ching, T.W. Ng and S.K. Chung, On Modeling SARS in Hong Kong, *International Journal of Applied Mathematics*, **13** (2003), no. 1, 1–7.
16. W.K. Ching, E. Fung, M. Ng and T.W. Ng, Multivariate Markov Models for the Correlation of Multiple Biological Sequences, *International Workshop on Bioinformatics, PAKDD Seoul, Korea* (2003), pp.23-34.
17. G. Hui, J.H. Zheng and T.W. Ng, On a new singular direction of meromorphic functions, *Bull. Austral. Math. Soc.* **69** (2004), no. 2, 277–287.

18. A.F. Beardon, D. Minda, T.K. Carne and T.W. Ng, Random iteration of analytic maps, *Ergodic Theory and Dynamical Systems*, **24** (2004), no. 3, 659–675.
19. W.S. Cheung and T.W. Ng, A companion matrix approach to the study of zeros and critical points of a polynomial, *Journal of Mathematical Analysis and Its Application*, **319** (2006), no. 2, 690-707.
20. T.W. Ng, J.H. Zheng and Y.Y. Choi, Residual Julia Sets of Meromorphic Functions, *Mathematical Proceeding of Cambridge Philosophical Society*, **141** (2006), no.1, 113-126.
21. A.F. Beardon and T.W. Ng, Parametrizations of algebraic curves, *Ann. Acad. Sci. Fenn.*, **31** (2006), 541-554.
22. Chung-Chau Hon, Tsan-Yuk Lam, Alexei Drummond, Andrew Rambaut, Yiu-Fai Lee, Chi-Wai Yip, Fanya Zeng, Pui-Yi Lam, Patrick T.W. Ng and Frederick C. C. Leung, Phylogenetic Analysis Reveals a Correlation between the Expansion of Very Virulent Infectious Bursal Disease Virus and Reassortment of Its Genome Segment B, *Journal of Virology*, **80** (2006), no.17, 8503-8509.
23. T.W. Ng, G. Turinici, W.K. Ching, S.K. Chung and A. Danchin, A parasite vector-host epidemic model for TSE propagation, *Medical Science Monitor* **13** (2007), no.3, 59-66.
24. Lydia W.T. Cheung, Y.F. Lee, T.W. Ng, W.K. Ching, U.S. Khoo, Michael K.P. Ng and Alice S.T. Wong, CpG/CpNpG motifs in the coding region are preferred sites for mutagenesis in the breast cancer susceptibility genes *FEBS Letters*, **581** (2007), Issue 24, 4668-4674.
25. Wai-Ki Ching, Yang Cong, Tuen Wai Ng, Allen H. Tai, A fast algorithm for the spread of HIV in a system of prisons. *Math. Comput. Modelling* **46** (2007), no. 9-10, 1247–1255.
27. Wai-Ki Ching, Yang Cong, Tuen Wai Ng, Zheng-Jian Bai, Some Infection Models for the Development of AIDS, *Lecture Notes in Operations Research 9, Optimization and Systems Biology*, (2008), 21-28
28. A. Eremenko, L.W. Laio and T.W. Ng, Meromorphic solutions of higher order Briot-Bouquet differential equations, *Mathematical Proceeding of Cambridge Philosophical Society*, **146** (2009), no. 1, 197–206.
29. T.L. Chan, W.S. Cheung and T.W. Ng, Graceful Tree Conjecture for Infinite Trees, *The Electronic Journal of Combinatorics*, **16** (2009), Research Paper 65, 15 pp.
30. Wai Shun Cheung and Tuen Wai Ng, Relationship between the zeros of two polynomials, *Linear Algebra and Its Applications*, **432** (2010), no.1, 107–115.
31. Robert Conte and Tuen Wai Ng, Meromorphic solutions of a third order nonlinear differential equation, *Journal of Mathematical Physics*, **51** (2010), no.3, 0335181-03351819.
32. W.K. Ching, L.M. Li, N.K. Tsing, C.T. Tai, T.W. Ng, A.S. Wong and K.W. Cheng, A weighted Local Least Squares Imputation method for missing value estimation in microarray gene expression data, *Int. J. Data Mining and Bioinformatics*, **4**, (2010), no. 3, 331–347.
33. K.W. Chow and T.W. Ng, Periodic solutions of a derivative nonlinear Schrodinger equation: Elliptic integrals of the third kind, *Journal of Computational and Applied Mathematics*, **235**, no. 13, (2011), 3825-3830.

34. R.Conte, T.W. Ng and K.K. Wong, Exact meromorphic solutions of the real cubic Swift-Hohenberg equation, *Studies in Applied Mathematics*, **129**, (2012), no. 1, 117–131.
35. R. Conte and T.W. Ng, Meromorphic Traveling Wave Solutions of the Complex Cubic-Quintic Ginzburg-Landau Equation, *Acta Applicandae Mathematicae* **122**, (2012), 153-V166.
36. T.W. Ng and M. Wang, Ritt’s theory on the unit disk, *Forum Mathematicum*, **25**, (2013), Issue 4, 821–851.
37. T.W. Ng and C.Y. Tsang Polynomials versus finite Blaschke products, *Blaschke products and their applications*, Fields institute communications, **65**, Editors: Javad Mashreghi and Emmanuel Fricain, (2013) 249–274.
38. W.S. Cheung, T.W. Ng and C.Y. Tsang, Density estimates on composite polynomials, *Journal of Australia Mathematical Society*, **95**, (2013). 329-342 .
39. W.S. Cheung, T.W. Ng, A Three-Dimensional Voting System in Hong Kong, *European Journal of Operational Research*, **236**, (2014) Issue 1, 1 July, 292–297.
40. P.L. Cheung, T. W. Ng and S. C. P. Yam, Critical points of random finite Blaschke products with independent and identically distributed zeros, *Complex Analysis and Potential Theory, 9th International Society for Analysis, its Applications and Computation (ISAAC) Congress, Krakow, Poland, in August 2013*, Eds.: T. Aliev Azeroglu, A.Golberg, S.Rogosin. Cambridge Scientific Publishers, Cambridge, UK,(2014), 23–30.
41. T.L. Chan, W.S. Cheung, T.W. Ng, Graceful labeling for mushroom trees, *Aequationes mathematicae*, **89**, (2015) Issue 3, June, 719–724.
42. P.L. Cheung, T. W. Ng, J. Tsai and S. C. P. Yam, Higher order, polar and Sz.-Nagy’s generalized derivatives of random polynomials with independent and identically distributed zeros on the unit circle, *Computational Methods and Function Theory*, **15**, (2015) Issue 1, March,159–186.
43. P.L. Cheung and T. W. Ng, Finiteness of fixed equilibrium configurations of point vortices in the plane with background flow, *Nonlinearity* , **27**, (2014), 2445-2463.
44. T.W. Ng and C.Y. Tsang, Chebyshev-Blaschke products, *Journal of Computational and Applied Mathematics*, **277**, (2015), 106–114.
45. R. Conte, T.W. Ng and C.F. Wu, Hayman’s classical conjecture on some nonlinear second-order algebraic ODEs, *Complex Variables and Elliptic Equations*, **60**, (2015), 1539-1552.
46. P. S. Lau, T. W. Ng and N.K. Tsing, The star-shapedness of a generalized numerical range, *Linear Algebra and its Applications*, **506**, (2016), 308–315.
47. P. S. Lau, T. W. Ng and N.K. Tsing, Convexity and star-shapedness of real linear images of special orthogonal orbits, *Linear Algebra and its Applications*, **507**, (2016), 51–67.

Editorship

1. Guest editor of Complex Variables and Elliptic Equations for the Special Issue Dedicated to Professor Chung-Chun Yang (Issue 1-4, pages 1-398, 2011).
2. Associate editor of The Bulletin of the Australian Mathematical Society (2013-).

Conferences (co)organized and membership of international research bodies

1. As a co-organizer of the Workshop on Complex Geometry at HKU in August 2009.
2. As a co-organizer of the Workshop on Complex Geometry at HKU in July 2010.
3. As a reviewer for the grant application of Austrian Science Fund (FWF) in 2010.
4. As a co-organizer of the Workshop on Complex Geometry at HKU in July 2011.
5. As a co-organizer of the Workshop on Complex Geometry at HKU in July 2012.
6. As the organizer of the Workshop on Function Theory at HKU in August 2012.
7. As a member of the Academic Committee of the 21th International Conference on Finite or Infinite Dimensional Complex Analysis and Applications (21thICFIDCAA) at Nanjing University in June 2013.
8. As a co-organizer of the Conference on Complex Geometry at HKU in June 2013.
9. As a co-organizer of the Workshop on Complex Geometry at HKU in July 2014.
10. As a co-organizer of the Workshop on Blaschke Products and Function Theory at HKU in July 2015.

Invited Talks

1. The First International ISAAC Congress, University of Delaware, USA (Aug 1997).
2. Imperial College, University of London, UK (Jan 1999).
3. The Second International ISAAC Congress, Fukuoka Institute of Technology, Japan (Aug 1999).
4. Function Theory Conference, University College, London (Sep 1999).
5. Special Section on Recent Advances in Complex and Harmonic Analysis, AMS Meeting at Washington DC (Jan 2000).
6. City University of New York, USA (July 2000).
7. Special Section on Value Distribution Theory and Complex Dynamics, AMS-HKMS joint Meeting at Hong Kong (Dec 2000).
8. HKMS Annual Meeting at The Hong Kong University of Science and Technology (May 2001).
9. Computational Methods and Function Theory 2001, University of Aveiro, Portugal, (June 2001).

10. Workshop on Complex Dynamics and Related Topics, the Research Institute for Mathematical Sciences, Kyoto University, Japan (Dec 2002).
11. Complex Analysis-ICM2002 Satellite Conference, Shanghai Jiao Tung University (Aug 2002).
12. Recent Developments in Several Complex Variables, Cauchy-Riemann Geometry and Complex Algebraic Geometry, The University of Hong Kong, China (Nov 2003).
13. Special Section on Value Distribution Theory in Classical and p -Adic Function Theory, American Mathematical Society Annual Meeting, Phoenix, Arizona, USA (Jan 2004).
14. SARS Mini-workshop, The Hong Kong University of Science and Technology, 2004.
15. 2004 International conference on Analysis and Its Applications, Nanjing University, China (July, 2004).
16. 2004 Beijing-International conference on Several Complex Variables, Capital Normal University, China (Aug 2004).
17. Seminar on Public Health and Sustainable Development, The Sustainable Development Unit of the SAR government, Hong Kong, 2004.
18. Conference on Riemann surfaces and Kleinian groups, Research Institute for Mathematical Sciences, Kyoto University, Japan (Dec 2004).
19. Hong Kong Mathematical Society Annual Meeting, The Hong Kong University of Science and Technology, (April 2005).
20. Computational Methods and Function Theory, University of Joensuu, Finland (June 2005).
21. Workshop on Complex and Algebraic Geometry, The University of Hong Kong (July 2005).
22. The 13th International Conference on Finite or Infinite Dimensional Complex Analysis and Applications, Shantou University, China (Aug 2005).
23. Workshop on Complex Analysis, Tsinghua University (April 2006).
24. Seminar in Complex Analysis, Centre for Mathematical Studies, University of Cambridge (June 2006).
25. Geometry Seminar, Fudan University (October 2006).
26. Function Theory Seminar, Purdue University (February 2007).
27. Departmental Seminar, Northern Illinois University (March 2007).
28. Analysis Seminar, University of Illinois at Urbana-Champaign (April 2007).
29. Workshop on Complex Geometry, The University of Hong Kong (July 2007).
30. International Workshop on Value Distribution Theory and Its Applications, Shandong University (July 2007).
31. Summer School on Value Distribution Theory, Jiangxi Normal University (August 2007).
32. One Day Function Theory meeting, London Mathematical Society (September 2007).

33. Analysis Seminar, Christian-Albrechts-Universität (Kiel, Germany) (November 2007).
34. Alan Beardon's retirement meeting, University of Cambridge (December, 2007).
35. Workshop on Dynamical Systems and Analysis on Fractals, The Chinese University of Hong Kong (April, 2008).
36. Workshop on complex dynamics, Fudan University (October,2008).
37. Computational Methods and Function Theory (CMFT2009) (Turkey) (June 2009).
38. Workshop on Complex Geometry, HKU (August 2009).
39. Seminar on Pure Mathematics, HKUST (February, 2010).
40. Hong Kong Mathematical Society Annual General Meeting (March 2010).
41. International Conference on Applied Mathematics, City University of Hong Kong (June, 2010).
42. 18th International Conference on Finite or Infinite Dimensional Complex Analysis and Applications (18thICFIDCAA), University of Macau (August, 2010).
43. Workshop on Complex Geometry, HKU (July, 2010).
44. FIM - Institute for Mathematical Research, ETH Zurich (October, 2010).
45. International Conference on Asymptotics and Special Functions, City University of Hong Kong (May,2011).
46. Conference on Blaschke Products and their Applications Fields Institute, University of Toronto (July, 2011).
47. Workshop on Complex Geometry, HKU (August, 2011).
48. Analysis Seminar, City University of Hong Kong (November 2011).
49. Frontiers of Nevanlinna Theory 4: Nevanlinna theory and number theory, University College London (June 2012).
50. Workshop on Complex Geometry, HKU (July, 2012).
51. Analysis Seminar, City University of Hong Kong (July 2012).
52. International Conference on Advances on Fractals and Related Topics, The Chinese University of Hong Kong (December 2012)
53. The role of complex analysis in complex dynamics in ICMS, The University of Edinburgh (May 2013).
54. Computational Methods and Function Theory (CMFT2013), Shatou) (June 2013).
55. 21th International Conference on Finite or Infinite Dimensional Complex Analysis and Applications (21thICFIDCAA), Nanjing University (June, 2013).
56. Conference on Complex Geometry, HKU (June, 2013).
57. Analysis Seminar, City University of Hong Kong (August 2013).

58. Geometry Seminar, School of Mathematical Sciences, Xiemen University (December 2013).
59. Workshop on Complex Geometry, HKU (July, 2014).
60. 2014 International Workshop of Complex Analysis and Its Applications, Guangzhou University (November 2014).
61. International Conference on Applied Mathematics, City University of Hong Kong (December 2014).
62. Workshop on Complex Analysis, Tsinghua University (March 2015).
63. Departmental Seminar, University of Macau (April 2015).
64. Modern Aspects of Complex Geometry, University of Cincinnati (May 2015).
65. The 10th International ISSAC Congress, University of Macau (August 2015).
66. 2016 Nanjing Workshop on Complex Analysis and Its Applications, Jiangsu Second Normal University (16-18 April 2016).
67. The third Russian-Chinese conference on complex analysis, algebra, algebraic geometry and mathematical physics, Steklov Mathematical Institute, Moscow (10-16 May 2016).
68. International Conference on Applied Mathematics, City University of Hong Kong (30 May - 2 June 2016).
69. Random Matrices, EurAsia 2016, University of Macau (8-10 July 2016)

Public & Community Service

Panel member of CDC-HKEAA Committee on Mathematics Education(Senior Secondary) Working Group on New Senior Secondary Mathematics Curriculum (compulsory Part), 2005-2007.

Chairperson of Test Development Committee (Secondary Mathematics) of HKEAA, 2008-2009.

External examiner for the Certificate in Professional Development Programmes under the discipline of "Mathematics" offered by the Hong Kong Institute of Education for the academic year 2014/15 and 2015/16.

External examiner for the Certificate in Professional Development Programmes under the discipline of "Mathematics" offered by The Education University of Hong Kong for the academic year 2016/17 and 2018/19.

Independent Manager of Po Leung Kuk No.1 W.H.Cheung College, 2015-2017.