

Gary Pui Tung CHOI

Department of Mathematics, The Chinese University of Hong Kong

PERSONAL INFORMATION

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EMPLOYMENT

The Chinese University of Hong Kong, Hong Kong
▪ **Vice-Chancellor Assistant Professor**, Department of Mathematics 2023–Present
Massachusetts Institute of Technology, Cambridge, MA, USA
▪ **NSF Postdoctoral Fellow and Instructor in Applied Mathematics** 2020–2023
• Sponsoring Scientist: [Jörn Dunkel](#)

EDUCATION

Harvard University, Cambridge, MA, USA
▪ **Ph.D. in Applied Mathematics** 2016–2020
• Advisors: [L. Mahadevan FRS](#) and [Chris Rycroft](#)
• Dissertation: “Metamaterials, Morphometrics, Morphogenesis, and Mappings”
▪ **S.M. in Applied Mathematics** 2019
The Chinese University of Hong Kong, Hong Kong
▪ **M.Phil. in Mathematics** 2014–2016
• Advisor: [Ronald Lok Ming Lui](#)
• Thesis: “Surface Conformal/Quasi-conformal Parameterization with Applications”
(with 2017 New World Mathematics Award, Silver Medal for Master Thesis)
▪ **B.Sc. in Mathematics** (First Class Honors) 2010–2014
• Streams: Enrichment Stream in Mathematics, Computational and Applied Mathematics Stream
• Minors: Computer Science, Earth System Science

RESEARCH INTERESTS

Applied and Computational Geometry, Interdisciplinary Mathematical Modeling, Mechanical Metamaterials, Quantitative Biology, Medical Imaging, Geometry Processing, Scientific Computing

PUBLICATIONS

(*:equal contribution; †:corresponding author)

PREPRINT/SUBMITTED

- [51] [G. P. T. Choi](#)[†] and M. Shaqfa, “[Hemispheroidal parameterization and harmonic decomposition of simply connected open surfaces](#),” Preprint, arXiv:2407.15417.
- [50] S. Mosleh*, [G. P. T. Choi](#)*, L. Mahadevan, “[Data-driven quasiconformal morphodynamic flows](#),” Preprint, arXiv:2404.07073.
- [49] Z. Lyu, L. M. Lui, [G. P. T. Choi](#)[†], “[Spherical density-equalizing map for genus-0 closed surfaces](#),” Preprint, arXiv:2401.11795.
- [48] G. Notomista, [G. P. T. Choi](#), M. Saveriano, “Reactive robot navigation using quasi-conformal mappings and control barrier functions,” submitted.
- [47] M. Shaqfa, [G. P. T. Choi](#), G. Anciaux, K. Beyer, “[Disk harmonics for analysing curved and flat self-affine rough surfaces and the topological reconstruction of open surfaces](#),” Preprint, arXiv:2403.07001.

ACCEPTED/PUBLISHED

- [46] T. Ohmura, D. J. Skinner, K. Neuhaus, G. P. T. Choi, J. Dunkel, K. Drescher, “*In vivo microrheology reveals local elastic and plastic responses inside three-dimensional bacterial biofilms*,” *Advanced Materials*, 36(29), 2314059 (2024).
• Selected as Editors’ Choice.
- [45] G. P. T. Choi[†], “Fast ellipsoidal conformal and quasi-conformal parameterization of genus-0 closed surfaces,” *Journal of Computational and Applied Mathematics*, 447, 115888 (2024).
- [44] Z. Lyu, G. P. T. Choi, L. M. Lui, “Bijective density-equalizing quasiconformal map for multiply connected open surfaces,” *SIAM Journal on Imaging Sciences*, 17(1), 706–755 (2024).
- [43] S. Mosleh*, G. P. T. Choi*, G. M. Musser, H. F. James, A. Abzhanov, L. Mahadevan, “Beak morphometry and morphogenesis across avian radiations,” *Proceedings of the Royal Society B*, 290(2007), 20230420 (2023).
- [42] Y. Guo, Q. Chen, G. P. T. Choi, L. M. Lui, “Automatic landmark detection and registration of brain cortical surfaces via quasi-conformal geometry and convolutional neural networks,” *Computers in Biology and Medicine*, 163, 107185 (2023).
- [41] L. H. Dudte*, G. P. T. Choi*, K. P. Becker, L. Mahadevan, “An additive framework for kirigami design,” *Nature Computational Science*, 3(5), 443–454 (2023).
• Featured in media outlets including *Nature Computational Science News & Views*, *MIT News*, *News 8 Plus*, *Mirage News*, and *Tech Xplore*.
- [40] G. P. T. Choi, L. Liu, L. Mahadevan, “Explosive rigidity percolation in kirigami,” *Proceedings of the Royal Society A*, 479(2271), 20220798 (2023).
- [39] G. P. T. Choi, L. M. Lui, “Recent developments of surface parameterization methods using quasi-conformal geometry,” *Handbook of Mathematical Models and Algorithms in Computer Vision and Imaging*, Springer, Cham, 1483–1523 (2023).
- [38] T. Dixit, G. P. T. Choi*, S. Al-Mosleh*, J. Lund, J. Troschianko, C. Moya, L. Mahadevan, C. N. Spottiswoode, “Combined measures of mimetic fidelity explain imperfect mimicry in a brood parasite-host system,” *Biology Letters*, 19(2), 20220538 (2023).
- [37] R. Supekar, B. Song, A. Hastewell, G. P. T. Choi, A. Mietke, J. Dunkel, “Learning hydrodynamic equations for active matter from particle simulations and experiments,” *Proceedings of the National Academy of Sciences*, 120, e2206994120 (2023).
- [36] Z. Zhu, G. P. T. Choi, L. M. Lui, “Parallelizable global quasi-conformal parameterization of multiply connected surfaces via partial welding,” *SIAM Journal on Imaging Sciences*, 15(4), 1765–1807 (2022).
- [35] L. Liu*, G. P. T. Choi*, L. Mahadevan, “Quasicrystal kirigami,” *Physical Review Research*, 4(3), 033114 (2022).
• Selected as Editors’ Suggestion.
- [34] S. Chen, F. Giardina, G. P. T. Choi, L. Mahadevan, “Modular representation and control of floppy networks,” *Proceedings of the Royal Society A*, 478(2264), 20220082 (2022).
- [33] G. P. T. Choi[†], A. Giri, L. Kumar, “Adaptive area-preserving parameterization of open and closed anatomical surfaces,” *Computers in Biology and Medicine*, 148, 105715 (2022).
- [32] D. Zhang, G. P. T. Choi, J. Zhang, L. M. Lui, “A unifying framework for n -dimensional quasi-conformal mappings,” *SIAM Journal on Imaging Sciences*, 15(2), 960–988 (2022).
- [31] H. Law, G. P. T. Choi, K. C. Lam, L. M. Lui, “Quasiconformal model with CNN features for large deformation image registration,” *Inverse Problems and Imaging*, 16(4), 1019–1046 (2022).
- [30] G. P. T. Choi, Y. Liu, L. M. Lui, “Free-boundary conformal parameterization of point clouds,” *Journal of Scientific Computing*, 90(1), 14 (2022).
- [29] S. Al-Mosleh, G. P. T. Choi, A. Abzhanov, L. Mahadevan, “Geometry and dynamics link form, function and evolution of finch beaks,” *Proceedings of the National Academy of Sciences*, 118(46), e2105957118 (2021).
• Featured in *Harvard SEAS News*.
- [28] G. P. T. Choi, L. H. Dudte, L. Mahadevan, “Compact reconfigurable kirigami,” *Physical Review Research*, 3(4), 043030 (2021).

- [27] M. Shaqfa, G. P. T. Choi, K. Beyer, “Spherical cap harmonic analysis (SCHA) for characterising the morphology of rough surface patches,” *Powder Technology*, 393, 837–856 (2021).
- [26] L. Liu*, G. P. T. Choi*, L. Mahadevan, “Wallpaper group kirigami,” *Proceedings of the Royal Society A*, 477(2252), 20210161 (2021).
- [25] B. Jarvis, G. P. T. Choi, B. Hockman, B. Morrell, S. Bandopadhyay, D. Lubey, J. Villa, S. Bhaskaran, D. Bayard, I. A. Nesnas, “3D shape reconstruction of small bodies from sparse features,” *IEEE Robotics and Automation Letters*, 6(4), 7089–7096 (2021).
- [24] M. B. Edwards, G. P. T. Choi, N. J. Derieg, Y. Min, A. C. Diana, S. A. Hodges, L. Mahadevan, E. M. Kramer, E. S. Ballerini, “Genetic architecture of floral traits in bee- and hummingbird-pollinated sister species of *Aquilegia* (columbine),” *Evolution*, 75(9), 2197–2216 (2021).
- [23] L. H. Dudte, G. P. T. Choi, L. Mahadevan, “An additive algorithm for origami design,” *Proceedings of the National Academy of Sciences*, 118(21), e2019241118 (2021).
- [22] G. P. T. Choi[†], “Efficient conformal parameterization of multiply-connected surfaces using quasi-conformal theory,” *Journal of Scientific Computing*, 87(3), 70 (2021).
- [21] G. P. T. Choi[†], C. H. Rycroft, “Volumetric density-equalizing reference map with applications,” *Journal of Scientific Computing*, 86(3), 41 (2021).
- [20] A. Giri*, G. P. T. Choi*,[†], L. Kumar, “Open and closed anatomical surface description via hemispherical area-preserving map,” *Signal Processing*, 180, 107867 (2021).
- [19] G. P. T. Choi, S. Chen, L. Mahadevan, “Control of connectivity and rigidity in prismatic assemblies,” *Proceedings of the Royal Society A*, 476(2244), 20200485 (2020).
- [18] G. P. T. Choi, D. Qiu, L. M. Lui, “Shape analysis via inconsistent surface registration,” *Proceedings of the Royal Society A*, 476(2242), 20200147 (2020).
- [17] A. Chakrabarti, G. P. T. Choi, L. Mahadevan, “Self-excited motions of volatile drops on swellable sheets,” *Physical Review Letters*, 124(25), 258002 (2020).
• Featured in media outlets including [Harvard SEAS News](#), [Phys.org](#), [Tech Explorist](#), and [N+1](#) (in Russian).
- [16] G. P. T. Choi, Y. Leung-Liu, X. Gu, L. M. Lui, “Parallelizable global conformal parameterization of simply-connected surfaces via partial welding,” *SIAM Journal on Imaging Sciences*, 13(3), 1049–1083 (2020).
- [15] S. Chen*, G. P. T. Choi*, L. Mahadevan, “Deterministic and stochastic control of kirigami topology,” *Proceedings of the National Academy of Sciences*, 117(9), 4511–4517 (2020).
- [14] G. P. T. Choi[†], B. Chiu, C. H. Rycroft, “Area-preserving mapping of 3D carotid ultrasound images using density-equalizing reference map,” *IEEE Transactions on Biomedical Engineering*, 67(9), 1507–1517 (2020).
- [13] G. P. T. Choi, H. L. Chan, R. Yong, S. Ranjitkar, A. Brook, G. Townsend, K. Chen, L. M. Lui, “Tooth morphometry using quasi-conformal theory,” *Pattern Recognition*, 99, 107064 (2020).
- [12] A. Pumarola, J. Sanchez-Riera, G. P. T. Choi, A. Sanfeliu, F. Moreno-Noguer, “3DPeople: Modeling the geometry of dressed humans,” *Proceedings of the IEEE International Conference on Computer Vision (ICCV)*, 2242–2251 (2019).
• Featured in media outlets including [AI³ | Theory, Practice, Business](#) and [Synced](#).
- [11] G. P. T. Choi, L. H. Dudte, L. Mahadevan, “Programming shape using kirigami tessellations,” *Nature Materials*, 18, 999–1004 (2019).
• Featured on the [cover](#) and in media outlets including [Harvard SEAS News](#), [Science Daily](#), [Interesting Engineering](#), [Phys.org](#), [Index Hungary](#) (in Hungarian), [fabcross](#) (in Japanese), [Asahi Shimbun](#) (in Japanese), and [Popular Mechanics](#).
- [10] G. P. T. Choi, L. Mahadevan, “Planar morphometrics using Teichmüller maps,” *Proceedings of the Royal Society A*, 474(2217), 20170905 (2018).
- [9] C. P. Yung, G. P. T. Choi, K. Chen, L. M. Lui, “Efficient feature-based image registration by mapping sparsified surfaces,” *Journal of Visual Communication and Image Representation*, 55, 561–571 (2018).
- [8] G. P. T. Choi[†], C. H. Rycroft, “Density-equalizing maps for simply connected open surfaces,” *SIAM Journal on Imaging Sciences*, 11(2), 1134–1178 (2018).
- [7] G. P. T. Choi, L. M. Lui, “A linear formulation for disk conformal parameterization of simply-connected open surfaces,” *Advances in Computational Mathematics*, 44(1), 87–114 (2018).

- [6] G. P. T. Choi, Y. Chen, L. M. Lui, B. Chiu, “Conformal mapping of carotid vessel wall and plaque thickness measured from 3D ultrasound images,” *Medical & Biological Engineering & Computing*, 55(12), 2183–2195 (2017).
- [5] G. P. T. Choi, M. H. Y. Man, L. M. Lui, “Fast spherical quasiconformal parameterization of genus-0 closed surfaces with application to adaptive remeshing,” *Geometry, Imaging and Computing*, 3(1–2), 1–29 (2016).
- [4] T. W. Meng, G. P. T. Choi, L. M. Lui, “TEMPO: Feature-endowed Teichmüller extremal mappings of point clouds,” *SIAM Journal on Imaging Sciences*, 9(4), 1922–1962 (2016).
- [3] G. P. T. Choi, K. T. Ho, L. M. Lui, “Spherical conformal parameterization of genus-0 point clouds for meshing,” *SIAM Journal on Imaging Sciences*, 9(4), 1582–1618 (2016).
- [2] P. T. Choi, L. M. Lui, “Fast disk conformal parameterization of simply-connected open surfaces,” *Journal of Scientific Computing*, 65(3), 1065–1090 (2015).
- [1] P. T. Choi, K. C. Lam, L. M. Lui, “FLASH: Fast landmark aligned spherical harmonic parameterization for genus-0 closed brain surfaces,” *SIAM Journal on Imaging Sciences*, 8(1), 67–94 (2015).

RESEARCH FUNDING

■ (PI) CUHK Faculty of Science Direct Grant for Research (HK\$150,000)	2024/01–2024/12
■ (PI) CUHK Research Data Management Development Fund (HK\$100,000)	2024/01–2025/12
■ (PI) Croucher Foundation Start-up Allowance (HK\$500,000)	2023/08–2028/07
■ (PI) CUHK Research Startup Matching Support (HK\$500,000)	2023/08–2026/07
■ (PI) CUHK VC Early Career Professorship Startup Fund (HK\$2,000,000)	2023/08–2026/07
■ (Co-I) HKRGC General Research Fund #14306723 (HK\$877,079)	2024/01–2026/12
■ (Co-I) HKRGC General Research Fund #14307622 (HK\$783,000)	2023/01–2025/12
■ (PI) US National Science Foundation MSPRF DMS-2002103 (US\$150,000)	2020/07–2023/06

AWARDS AND HONORS

■ CUHK Vice-Chancellor Early Career Professorship	2023
■ SIAM Early Career Travel Award	2022
■ NSF Mathematical Sciences Postdoctoral Research Fellowship	2020–2023
■ SIAM Student Travel Award	2020
■ NSF-Simons QuantBio Student Fellowship, Harvard University	2019–2020
■ Silver Medal for Master Thesis, New World Mathematics Award	2017
■ Best Poster Award, Workshop on Applications-Driven Geometric Functional Data Analysis	2017
■ Certificate of Distinction in Teaching, Harvard University	2017
■ Croucher Foundation Scholarship, Croucher Foundation	2016–2019
■ Hong Kong Scholarship for Excellence, HKSAR Government	2016
■ Mr. Ch’ien Mu Postgraduate Scholarship, New Asia College, CUHK	2016
■ Best Teaching Assistant Award, Department of Mathematics, CUHK	2014–2015

PRESENTATIONS

■ SIAM Conference on Imaging Science (SIAM-IS24), Atlanta, GA, USA <i>Geometric design of kirigami metamaterials</i>	May 2024
■ SIAM Conference on Applied Linear Algebra (SIAM-LA24), Paris, France <i>Kirigami metamaterial design using linear algebra</i>	May 2024
■ CUHK SIAM Student Annual Workshop, Hong Kong <i>Density-equalizing map with applications</i>	Mar 2024
■ 2024 Joint Mathematics Meetings (JMM 2024), San Francisco, CA, USA <i>Quantifying shape variation using quasi-conformal geometry</i>	Jan 2024
■ BIRS Workshop on Mathematical Methods for Exploring and Analyzing Morphological Shapes across Biological Scales, Banff, Canada (Virtual) <i>Quantifying shape variation using quasi-conformal geometry</i>	Sep 2023
■ The 10th International Congress on Industrial and Applied Mathematics (ICIAM 2023), Tokyo, Japan <i>Density-equalizing map with applications</i>	Aug 2023
■ Geometry and Packing in Materials Science and Biology (GeomPack) (Virtual) <i>Geometric design of kirigami metamaterials</i>	Dec 2022
■ New England Workshop on the Mechanics of Materials and Structures (NEW.Mech 2022), Cambridge, MA, USA <i>Additive kirigami</i>	May 2022

■ SIAM Conference on Imaging Science (SIAM-IS22) (Virtual)	Mar 2022
<i>Geometric design of kirigami metamaterials</i>	
■ APS March Meeting 2022, Chicago, IL, USA	Mar 2022
<i>Additive design of origami and kirigami</i>	
■ APS March Meeting 2021 (Virtual)	Mar 2021
<i>Reconfigurable kirigami</i>	
■ SIAM Conference on Imaging Science (SIAM-IS20) (Virtual)	Jul 2020
<i>Quantifying shape variation using quasi-conformal geometry</i>	
■ The 8th Annual Winter Q-Bio Conference (2020 Winter Q-Bio), Waikoloa Village, HI, USA	Feb 2020
<i>Planar morphometrics via Teichmüller mappings</i>	
■ MIT Physical Mathematics Seminar, Cambridge, MA, USA	Dec 2019
<i>Geometric and topological control of kirigami</i>	
■ New England Workshop on the Mechanics of Materials and Structures (NEW.Mech 2019), Amherst, MA, USA	Oct 2019
<i>Geometric and topological control of kirigami</i>	
■ APS March Meeting 2019, Boston, MA, USA	Mar 2019
<i>Inverse kirigami design</i>	
■ SIAM Conference on Computational Science and Engineering (SIAM-CSE19), Spokane, WA, USA	Feb 2019
<i>Density-equalizing reference map with applications</i>	
■ International Conference on Applied Mathematics (ICAM) 2018, Hong Kong	Jun 2018
<i>Density-equalizing maps for simply-connected open surfaces</i>	
■ New England Workshop on the Mechanics of Materials and Structures (NEW.Mech 2017), Cambridge, MA, USA	Oct 2017
<i>Programming shape using kirigami tessellations</i>	
■ Workshop on Applications-Driven Geometric Functional Data Analysis, Tallahassee, FL, USA	Oct 2017
<i>Planar morphometrics via Teichmüller mappings (with the Best Poster Paper Award)</i>	
■ The Third International Conference on Engineering and Computational Mathematics (ECM2017), Hong Kong	Jun 2017
<i>Planar morphometrics via Teichmüller mappings</i>	
■ Croucher Symposium 2016, Hong Kong	Dec 2016
<i>Geometric problems in biology</i>	
■ International Conference on Applied Mathematics (ICAM) 2016, Hong Kong	Jun 2016
<i>Spherical conformal parameterization of genus-0 point clouds for meshing</i>	
■ The Hong Kong Mathematical Society Annual General Meeting 2016, Hong Kong	May 2016
<i>Spherical conformal parameterization of genus-0 point clouds for meshing</i>	
■ The Hong Kong Mathematical Society Annual General Meeting 2015, Hong Kong	May 2015
<i>Fast Disk conformal parameterization of simply-connected open surfaces</i>	
■ International Conference on Applied Mathematics (ICAM) 2014, Hong Kong	Dec 2014
<i>FLASH: Fast landmark aligned spherical harmonic parameterization for genus-0 closed brain surfaces</i>	
■ 2014 Imaging Science Camp, Guangzhou, China	Nov 2014
<i>FLASH: Fast landmark aligned spherical harmonic parameterization for genus-0 closed brain surfaces</i>	
■ SIAM Conference on Imaging Science (SIAM-IS14), Hong Kong	May 2014
<i>Fast optimized harmonic registration of genus-0 closed surfaces with landmark constraints</i>	

TEACHING

The Chinese University of Hong Kong

- **Lecturer**, Department of Mathematics 2023–Present
 - MATH1010 University Mathematics, Fall 2023.

Massachusetts Institute of Technology

- **Instructor in Applied Mathematics**, Department of Mathematics 2021–2023
 - (Course Administrator) 18.03 Differential Equations, Spring 2023.
 - (Lecturer) 18.085/18.0851 Computational Science and Engineering, Fall 2022. (Student evaluation = 6.2/7.0)
 - (Guest Lecturer) 18.04 Complex Variables with Applications, Spring 2022.
 - (Recitation Instructor) 18.06 Linear Algebra, Spring 2022. (Student evaluation = 6.6/7.0)
 - (Recitation Instructor) 18.03 Differential Equations, Fall 2021. (Student evaluation = 6.2/7.0)

Harvard University

- **Teaching Fellow**, John A. Paulson School of Engineering and Applied Sciences (SEAS) 2017
 - AM205 Advanced Scientific Computing: Numerical Methods, Fall 2017.
 - (with *Certificate of Distinction in Teaching*; Student evaluation = 4.71/5.00, SEAS average = 4.29/5.00)

The Chinese University of Hong Kong

- **Teaching Assistant**, Department of Mathematics 2014–2016
 - MATH3220 Operations Research and Logistics, Spring 2016.
 - MATH3080 Number Theory, Fall 2015.
 - MATH3220 Operations Research and Logistics, Spring 2015. (with 2014–15 *Best Teaching Assistant Award*)
 - MATH3080 Number Theory, Fall 2014. (with 2014–15 *Best Teaching Assistant Award*)
- **Teaching Assistant Leader**, EPYMT 2012–2015

The Enrichment Programme for Young Mathematics Talents (EPYMT) is an enrichment programme offered by the Department of Mathematics for mathematically gifted secondary school students.

 - SAYT1134 Towards Differential Geometry, Summer 2015.
 - SAYT1134 Towards Differential Geometry, Summer 2014.
 - SAYT1114 Number Theory and Cryptography, Summer 2012.
- **Assistant Mentor**, EPYMT 2011–2013
 - CUSA0114 Enrichment Mentoring Mathematics II, November 2012 – July 2013.
 - CUSA0104 Enrichment Mentoring Mathematics I, October 2012 – July 2013.
 - CUSA0114 Enrichment Mentoring Mathematics II, October 2011 – June 2012.
- **Teaching Assistant**, EPYMT 2011–2012
 - SAYT1134 Towards Differential Geometry, Summer 2012.
 - SAYT1154 Mathematical Analysis: An Overture I, Spring 2012.
 - SAYT1114 Number Theory and Cryptography, Summer 2011.
 - CUSA1014 Geometric Perspectives of Complex Numbers, Summer 2011.

MENTORING

UNDERGRADUATE STUDENTS

- **Ivan Pak-Kiu Fong** (CUHK) 2024–Present
 - Topic: Surface parameterization and harmonics
- **Jerry Jijun Cui** (CUHK) 2023–Present
 - Topic: Functional and shape data analysis
- **Yanwen Huang** (CUHK) 2023–Present
 - Topic: Density-equalizing maps
- **Lucy Liu** (Harvard University) 2019–2022
 - Senior thesis: “Beyond Grid Kirigami”
 - Publications: Proc. R. Soc. A (2020); Phys. Rev. Research (2022)
 - Next position: Ph.D. Student in Applied Mathematics, Harvard University

HIGH SCHOOL STUDENTS

- **Hiu-Long Chan** (Baptist Lui Ming Choi Secondary School, Hong Kong) 2022
 - Research project: “On the Coprime Product Series and Its Divergence and Bounds” (with Bock-Man Cheung)
 - Award: Gold Award in Mathematics, 2022 S.T. Yau High School Science Award (Asia)
 - Next position: Undergraduate Student in Mathematics, University of Southampton
- **Bock-Man Cheung** (Baptist Lui Ming Choi Secondary School, Hong Kong) 2022
 - Research project: “On the Coprime Product Series and Its Divergence and Bounds” (with Hiu-Long Chan)
 - Award: Gold Award in Mathematics, 2022 S.T. Yau High School Science Award (Asia)
 - Next position: Undergraduate Student in Mathematics, UCLA

SERVICE

- Internal Service, CUHK Mathematics
 - Committee on Outreach Activities, 2024–Present
 - Thesis Committee, 2024–Present
 - Yuchen Guo (Ph.D. '24), Chenran Lin (Ph.D. '24), Zhiyuan Lyu (Ph.D. '24), Ka-Ho Lai (M.Phil. '24)
- Internal Service, MIT Mathematics
 - Undergraduate Academic Advisor, 2022–2023
 - Graduate Student Teaching Mentor, 2022
- Conference Organization
 - Co-organizer, Minisymposium on “Geometry, Computing and Learning for Science and Engineering”, SIAM Conference on Imaging Science (SIAM-IS) 2022
- Editorial Boards
 - Frontiers in Materials, 2023–Present
- Referee Service

- Journal reviewer
Nature Materials · Nature Communications · Advanced Materials · Communications Physics · Communications Materials · Physical Review Applied · Extreme Mechanics Letters · Meccanica · PLOS Computational Biology · IEEE Transactions on Visualization and Computer Graphics · IEEE Transactions on Medical Imaging · IEEE Transactions on Control Systems Technology · SIAM Journal on Imaging Sciences · Journal of Scientific Computing · Computer Aided Geometric Design · Journal of Mathematical Imaging and Vision · Computational Geometry: Theory and Applications · Science China Mathematics · La Mathematica · Geometry, Imaging and Computing · Mathematics, Computation and Geometry of Data · Current Medical Imaging Reviews
- Conference reviewer
IEEE International Conference on Soft Robotics (RoboSoft)
International Conference on Geometric Modeling and Processing (GMP)
- Proposal reviewer
Dutch Research Council

OUTREACH ACTIVITIES

- **Invited Speaker**, Baptist Lui Ming Choi Secondary School, Hong Kong 2024
• Topic: Mathematics and nature
- **Invited Speaker**, Baptist Lui Ming Choi Secondary School, Hong Kong (Virtual) 2021
• Topic: Origami and kirigami: art, mathematics, science and technology
- **Invited Speaker**, Baptist Lui Ming Choi Secondary School, Hong Kong (Virtual) 2020
• Topic: On mathematics study and research
- **ICED Epic Innovation Session Presenter**, Innovative Conceptual Engineering Design Program, Nipmuc Regional High School, USA 2019
• Gave a talk about designing shape-shifting structures using kirigami to high school students, teachers, and community members in Massachusetts for promoting science, technology and innovation.
- **Hang Lung Fun Math Tutorial Class Volunteer**, Hang Lung As One Volunteer Team and Department of Mathematics, CUHK, Hong Kong 2016
• Provided free mathematics tutoring service to underprivileged primary school students and organized mathematics-related games to arouse their interest in mathematics.
- **Mathematics Teacher Volunteer**, Hang Lung As One Volunteer Team and Department of Mathematics, CUHK, Hong Kong 2015
• Provided free mathematics tutoring service to underprivileged primary school students.

SOFTWARE

SURFACE PARAMETERIZATION AND HARMONICS

- Spherical Density-Equalizing Map 2024
<https://github.com/garyptchoi/spherical-density-equalizing-map>
- Ellipsoidal Conformal and Quasi-Conformal Map 2023
<https://github.com/garyptchoi/ellipsoidal-map>
- Multiply-Connected Quasiconformal Map 2023
<https://github.com/garyptchoi/multiply-connected-quasiconformal-map>
- Spherical Cap Harmonics 2021
<https://github.com/eesd-epfl/spherical-cap-harmonics>
- Poly-Annulus Conformal Map 2021
<https://github.com/garyptchoi/poly-annulus-conformal-map>
- Rectangular Conformal Map 2016
<https://www.mathworks.com/matlabcentral/fileexchange/67117-rectangular-conformal-map>
(also available on GitHub: <https://github.com/garyptchoi/rectangular-conformal-map>)
- Disk Conformal Map 2015
<https://www.mathworks.com/matlabcentral/fileexchange/65571-disk-conformal-map>
(also available on GitHub: <https://github.com/garyptchoi/disk-conformal-map>)
- Spherical Conformal Map 2015
<https://www.mathworks.com/matlabcentral/fileexchange/65551-spherical-conformal-map>
(also available on GitHub: <https://github.com/garyptchoi/spherical-conformal-map>)

IMAGE PROCESSING

- **TRIM: Triangulating Image** 2018
<https://www.mathworks.com/matlabcentral/fileexchange/68629-trim-triangulating-image>
(also available on GitHub: <https://github.com/garyptchoi/TRIM>)

METAMATERIALS

- Additive Kirigami 2022
<https://github.com/garyptchoi/additive-kirigami>

- 2D Kirigami Deployment Simulator 2021
https://github.com/lli12/kirigami_sim
- Inverse Kirigami Design 2019
<https://github.com/garyptchoi/inverse-kirigami-design>

Last updated on 2024-07-23