Ka Wai (Karry) Wong

About me

I am a passionate believer in computer algorithms and an active learner of machine learning and data science. My PhD research lies in computational geometry with focus on shape analysis. My project is to apply the mean curvature flow to map a 2D surface onto a unit sphere conformally and I have developed a fast and robust algorithm to obtain such a conformal map. The code is in C++ with mesh data structure OpenMesh. Now I am working on x-ray image analysis and 3D hotspot reconstruction via computed tomography at LLNL.

Education

2016–2021	**Ph.D. Applied Mathematics (GPA: 3.9)**, *UC Davis, expected graduation Dec 2021*.
2011–2015	**M.Sc. Mathematics**, *The Technical University of Munich*, Germany.
2014–2015	**Visiting Scholar**, *The Hebrew University of Jerusalem*, Israel.
2012-2013	**Academic Exchange**, *Technion – Israel Institute of Technology*, Israel.
2008–2011	**B.Sc. Mathematics (1st Hons.)**, *Hong Kong University of Science & Technology*.

Professional Experience

Dec. 2019 - Dec. 2020   **Research Intern**, *National Ignition Facility, Lawrence Livermore National Laboratory*.
My research project is to develop algorithms for image analysis using MATLAB that
- performs 3D reconstructions of X-ray emission distributions from very limited 2D projections and uses reconstructions to measure thermonuclear plasma properties e.g. temperature
- conducts errors and uncertainties quantification in 3D reconstructions and data analysis of pinhole and penumbral images

A 3-minute overview in Summer SLAM: https://youtu.be/m72JuuaUUJI

Jul. - Sept. 2019   **Intern on WiFi in 5G**, *Rohde & Schwarz USA*, Beaverton, Oregon.
I was enthusiastic to get to know the 5G development, mainly Wi-Fi 6 and WLAN technologies
- Wrote automated test cases for IP configurations with different 802.11 standards.
- Coded in Python, practised with IBM Rational Team Concert, and worked within SCRUM.

Summers 2017/18/19   **Graduate Student Researcher**, *Center for Educational Effectiveness*, UC Davis.
My aspiration and impact were to help minority groups to achieve academic success.
- Analyzed 5,000+ data of students with social disadvantages and assessed the impact of remedial learning using online learning software ALEKS on student performance.

Apr.–Sept. 2016   **Software Testing Engineer**, *Rohde & Schwarz GmbH & Co. KG.*, Munich, Germany.
Specialized in automated testing for wireless communications with 4G technologies (LTE)
- Defined and implemented test cases for new features of R&S®CMW500 Callbox;
Coded in Python and practised with bugtracker Bugzilla and IBM ClearCase.

Mar.–May. 2014   **Intern**, *Siemens AG Corporate Technology*, Munich, Germany.
- Developed a multigrid solver using finite element discretizations to solve differential equations;
Coded in MATLAB, Simulink and C++ (Visual Studio Microsoft).

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Publications and Presentations

[1] Ka Wai Wong. *conformal parametrization of surfaces of genus zero and 3d reconstruction of nuclear fusion hotspots*, Dissertation at UC Davis, submitted.

[2] Ka Wai Wong. *3-d electron temperature and x-ray emission tomography of the icf hotspot at the national ignition facility*, Poster at APS DPP meeting, Nov 2020.

[3] Ka Wai Wong. *application of mean curvature flow for surface parametrizations*. Proceedings of the John H. Barrett Memorial Lectures held at the University of Tennessee, Knoxville, May 29-June 1, 2018.

[4] Ka Wai Wong and Benjamin Bachmann. *3D x-ray emission tomography and electron temperature measurement of inertial confinement fusion hotspots*. in preparation.

Programming Languages

Python	2+ years; object-oriented programming & pytest in software testing
C/C++	2+ years; Parallel computing: OpenMP; Libraries in linear algebra: Eigen, CHOLMOD
MATLAB	4+ years; Geometric flows, mesh generation, multigrid, iterative solvers (e.g.GMRES)
R	1 year; used VGAM in simple linear regression, ivreg in instrumental variable regression
Pytorch	3 months (ongoing); Basics in machine learning, courses on Deep Learning at Coursera

Languages

Fluent – English, German, Mandarin; Native – Cantonese; Conversational – Hebrew

Certificates & Awards

2020 **SPOT award**, *Physical and Life Science Directorate*, LLNL.
This award is testament to the oustanding contributions, exceptional creativity, and extraordinary productivity I demonstrated in my internship project.

2020 **Outstanding Graduate Student Teaching Award**, UC Davis.
This award recognizes excellence in teaching by graduate students. The selection process is highly competitive and I was chosen out of 2,000 teaching assistants across campus.

2018 **William Karl Schwarze Mathematics Scholarship ($4,500)**, UC Davis.
For outstanding mathematical scholarship and exceptional promise of making a strong professional contribution as a mathematics educator at the pre-college or college level.

References

1. Prof. Joel Hass (Thesis advisor, Mathematics, UC Davis), hass@math.ucdavis.edu

2. Prof. Patrice Koehl (Thesis co-advisor, Computer Science, UC Davis), koehl@cs.ucdavis.edu

3. Dr. Benjamin Bachmann (Mentor, LLNL), bachmann2@llnl.gov

4. Dr. Alex Zylstra (Experimental physicist, LLNL), zylstra1@llnl.gov

5. Mr. David Connolly (Team lead, Rohde & Schwarz), david.connolly@rsa.rohde-schwarz.com