Ka Wai (Karry) Wong

About me

I'm an applied mathematician with great passion in software engineering & data science. I'm currently working on 3D geometry modeling and data-driven analysis for nuclear fusion experiments. Earlier doctoral research was in computational geometry to develop fast algorithms (C++) for conformal maps, see GitHub. I've multiple industrial internship experiences in procedural programming and software development. I'm an excellent communicator with extensive intercultural experience.

Professional Experience

Since Oct. 2021 — **Postdoctoral researcher**, *Lawrence Livermore Natl Laboratory*, Livermore, California.
- Selected as the recipient of a highly competitive postdoctoral fellowship in high energy density physics for developing algorithms (MATLAB) in computed tomography and 3D geometry modeling of nuclear fusion hotspot
- Exploring data-driven approaches such as Bayesian inference and Markov-Chain Monte-Carlo method on experimental physics data by using python library emcee and the open-source dataset on nuclear fusion experiment simulations

Jun. - Sept. 2021 — **Software Engineer Intern**, *Autodesk*, San Francisco, California.
- Designed and developed a volume estimation algorithm (C++) using stochastic sampling for volumetric shapes in additive manufacturing features for CAD tool Fusion360
- Solved 3D geometry problems of solid models defined by implicit modeling and B-rep

Dec. 2019 - Jun. 2021 — **Graduate Student Researcher**, *Lawrence Livermore Natl Lab*.
- Researched on limited-view computed tomography algorithms (MATLAB) for 3D reconstruction from limited 2D projections; Gave a 3-minute SLAM on Youtube
- Analyzed and processed 100+ 2D x-ray experimental images for 3D reconstruction by using the MATLAB image processing toolbox extensively

Jul. - Sept. 2019 — **Software Engineer Intern**, *Rohde & Schwarz USA*, Beaverton, Oregon.
- Designed and successfully implemented automated unit testing cases in WiFi technology (various WLAN 802.11 standards) by coding in Python and using object oriented programming

Summers 2017/18/19 — **Graduate Student Researcher**, *Center for Educational Effectiveness*, UC Davis.
- Analyzed large dataset containing 10+ different performance metrics of 5,000+ students, who are from underrepresented minority groups and those with social disadvantages, from remedial learning using software ALEKS in order to help them achieve academic success

Apr. - Sept. 2016 — **Software Testing Engineer**, *Rohde & Schwarz GmbH & Co. KG.*, Munich, Germany.
- Coded automated unit test cases for R&S®CMW500 Callbox for 4G LTE testing

Mar. - May. 2014 — **Intern**, *Siemens AG Corporate Technology*, Munich, Germany.
- Developed a multigrid solver using finite element discretization to solve differential equations

Programming Languages

Python — 1+ years; Intensively trained on algorithms and data structure on Leetcode; Used pytest to write automated united tests for WiFi testing in object-oriented programming.

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C/C++ 3+ years; Used the mesh data structure library OpenMesh, linear algebra libraries Eigen and CHOLMOD, and multi-threaded computing OpenMP

MATLAB 5+ years; Generalized the use of Algebraic Iterative Reconstruction Toolbox for 3D geometry; Developed multigrid solver and numerical algebra solver (GMRES).

R 6 months; used `VGAM` and `ivreg` for linear and instrumental variable regressions

Fortran 3 months; constructed a 2D Laplace solver using algebra libraries BLAS and LAPACK

Ongoing Training in SWE & DS

From Oct 21 My Leetcode account - 283 problems solved (97 easy, 170 medium, and 16 hard); badges "Algorithm II" and "Data Structure I and II" recently earned; my own solutions maintained and updated in GitHub repository

From Nov 20 Machine Learning (TensorFlow & PyTorch) learnt on Coursera and practiced on Kaggle

Languages

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

Education

2016–2021 **Ph.D. Applied Math (GPA: 3.9)**, *University of California, Davis*, graduated in Sept.

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*.

Publications & Presentations

[1] KW Wong; B Bachmann. *3D x-ray emission tomography and electron temperature measurement of inertial confinement fusion hotspots*. ongoing revision, 2021.

[2] KW Wong. *Conformal parametrization of surfaces of genus zero and 3d reconstruction of nuclear fusion hotspots*, Dissertation at UC Davis and LLNL, Dec 2020.

[3] KW 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.

[4] KW 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.

[5] KW Wong. *Optimal isometric embeddings of surfaces in 3-dimensional spaces*, Master's thesis at TU Munich and Hebrew University, 2015.

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