Tyler H. Chang – CV

Numerical Optimization and Scientific Machine Learning, Senior Research Engineer

Mountain View, CA, USA



INTERESTS

Numerical optimization, scientific machine learning, high-performance and parallel computing, and open source software



EXPERIENCE

Jun 2024 - Present. Senior Research Engineer: Siemens Digital Industry Software, EDA / HAV Division

Postdoctoral appointee: Argonne National Laboratory, MCS Division Jun 2020 - May 2024.

Research fellow: Virginia Tech, Dept. of Computer Science Aug 2016 - May 2020.

Feb 2016 - Aug 2016. Research assistant: Old Dominion University, Dept. of Computer Science



EDUCATION

Ph.D., May 2020, Computer Science, Virginia Polytechnic Institute & State University (Virginia Tech)

B.S., May 2016, Computer Science & Mathematics (double-major), Virginia Wesleyan University, summa cum laude

Publicly Available Software

4. 2022 (latest release 2024). ParMOO: Python library for parallel multiobjective simulation optimization. Release: 0.4.1

Devs: **T. H. Chang** (lead), S. M. Wild, and H. Dickinson¹ Primary Prog. Lang: Python 3

git: https://github.com/parmoo/parmoo

3. 2020 (latest release 2024). DelaunaySparse: Interpolation via a sparse subset of the Delaunay triangulation.

Devs: T. H. Chang (lead), T. C. H. Lux, and L. T. Watson Primary Prog. Lang: Fortran 2003

git: https://github.com/vtopt/DelaunaySparse

2. 2022. VTMOP: Solver for blackbox multiobjective optimization problems.

Devs: T. H. Chang (lead) and L. T. Watson Primary Prog. Lang: Fortran 2008

git: https://github.com/vtopt/VTMOP

1. 2019. QAML: Quantum annealing math library.

Devs: T. C. H. Lux (lead), T. H. Chang, and S. S. Tipirneni Primary Prog. Lang: Python 3

git: https://github.com/tchlux/qaml



PUBLICATIONS (FROM 28 PEER-REVIEWED WORKS)

- 5. 2025. T. H. Chang and S. M. Wild. Designing a framework for solving multiobjective simulation optimization problems. To appear in INFORMS Journal on Computing, 33 pages. Preprint: https://arxiv.org/abs/2304.06881.
- 4. 2025. T. H. Chang, A. K. Gillette, and R. Maulik. Leveraging interpolation models and error bounds for verifiable scientific machine learning. Journal of Computational Physics 524, Article 113726, 23 pages. doi: 10.1016/j.jcp.2025.113726
- 3. 2023. T. H. Chang and S. M. Wild. ParMOO: a Python library for parallel multiobjective simulation optimization. Journal of Open Source Software 8(82), Article 4468, 5 pages. doi: 10.21105/joss.04468
- 2. 2022. T. H. Chang, L. T. Watson, J. Larson, N. Neveu, W. I. Thacker, S. Deshpande, and T. C. H. Lux. Algorithm 1028: VTMOP: Solver for blackbox multiobjective optimization problems. ACM Transactions on Mathematical Software 48(3), Article 36, 34 pages. doi: 10.1145/3529258
- 1. 2020. T. H. Chang, L. T. Watson, T. C. H. Lux, A. R. Butt, K. W. Cameron, and Y. Hong. Algorithm 1012: DELAUNAYSPARSE: Interpolation via a sparse subset of the Delaunay triangulation in medium to high dimensions. ACM Transactions on Mathematical Software 46(4), Article 38, 20 pages. doi: 10.1145/3422818

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¹= DOE SULI (undergraduate intern) at Argonne in my supervision



Research Funding Raised

- 3. Declined for FY 2024. **Key contributor**, \$400K/y for 1 year. *High performance computing for development of critical thermodynamic inputs for next generation thermal barrier coatings*, external grant
- 2. Mar 2023 Sep 2023. **Co-PI**, \$50K/y for 1 year. *A Scalable Multi-Physics Optimization Framework for Particle Accelerator Design*, institutional seed funding (LDRD 2023-0246)
- 1. Jun 2019 Dec 2019. **Primary awardee**, \$3K/mo for 6 months. *An Adaptive Weighting Scheme for Multiobjective Optimization*, DOE award for PhD students (DE-SC0014664)

Research Fellowships Awarded

- 5. Aug 2016 May 2020. Cunningham Doctoral Fellowship, Virginia Tech, Graduate School, guaranteed research funding
- 4. Aug 2019 May 2020. Davenport Leadership Fellowship, Virginia Tech, College of Engineering, \$4k supplemental award
- 3. Aug 2018 May 2019. Pratt Fellowship, Virginia Tech, College of Engineering, \$4k supplemental award
- 2. Aug 2017 May 2018. Pratt Fellowship, Virginia Tech, College of Engineering, \$4k supplemental award
- 1. Aug 2016 May 2017. Davenport Leadership Fellowship, Virginia Tech, College of Engineering, \$4k supplemental award

Misc. Awards and Accomplishments

- 4. Jan 2021. Nominee for Outstanding Dissertation Award, Virginia Tech, Graduate School
- 3. Apr 2016. Outstanding Student in Computer Science & Mathematics, Virginia Wesleyan University
- 2. Feb 2016. ACM International Collegiate Programming Competition (ICPC), winning team for CNU site, VA, USA
- 1. Feb 2015. ACM International Collegiate Programming Competition (ICPC), winning team for CNU site, VA, USA



LEADERSHIP AND SERVICE

Interns Advised

Jun 2022 - Aug 2022. Manisha Garg (UIUC), NSF MSGI (PhD student intern) at Argonne

Jun 2022 - Aug 2022. Hyrum Dickinson (UIUC), DOE SULI (undergraduate intern) at Argonne

Teaching

Jan 2022 - Feb 2024. Adjunct Professor: College of DuPage, Dept. of Computer and Info. Science (Intro to Python)

Jan 2020 - May 2020. Instructor of Record: Virginia Tech, Dept. of Computer Science (Data structures and algorithms)

Journal / Conference Referee

Journal of Open Source Software (2025–Present); Optimization Methods and Software (2025–Present); Journal of Supercomputing (2024–Present); INFORMS Journal on Computing (2023–Present); ACM Transactions on Mathematical Software (2021–Present); Quantum Information Processing (2021–Present); The Visual Computer Journal (2021); MDPI: Mathematical and Computer Applications (2021); Journal of Machine Learning Research (2019); ICIAM (2023); Supercomputing (2021); IEEE SoutheastCon (2018–2020)

Minisymposium Organizer

Multiobjective Optimization Software track in SIAM Conference on Optimization (2021); Geometric Methods for Machine Learning track in SIAM Conference on Computational Science and Engineering (2021)