

# Tyler H. Chang

Argonne National Laboratory  
Mathematics & Computer Science (MCS) Division  
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## Technical Skills

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**Programming Langs:** Python, Fortran, C/C++, Java, Matlab  
**Operating Systems:** MacOS, Unix/Linux  
**Markup Languages:** HTML/CSS, Markdown, reStructuredText, YAML, LaTeX, plain TeX  
**Tools + Frameworks:** numpy, pandas, scipy, matplotlib, tensorflow.keras, sklearn, PIL, OpenCV, pytest, sphinx, PyPI/pip, conda-forge, MPI, OpenMP, CUDA, Slurm, BLAS, LAPACK, git, GitHub Actions, GitFlow

## Relevant Experience

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Jun 2020 - Present. **Postdoctoral appointee: Argonne National Laboratory**, MCS Division

- Built, tested, and documented a Python framework for deploying multiobjective optimization solvers
- Deployed optimization solvers for accelerator design, material manufacturing, and inverse problems
- Advised graduate and undergraduate interns and contributed to research proposals

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

- Designed parallel algorithms and software for multivariate interpolation and blackbox optimization
- Applied solvers to problems in HPC performance modeling and tuning
- Conducted fundamental research in approximation theory and computational geometry

Jun 2019 - Dec 2019. **SCGSR awardee: Argonne National Laboratory**, MCS Division

- Conducting research in multiobjective optimization software via DOE SCGSR program (see awards)

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

- Aided in parallelizing NASA's FUN3D CFD kernel on NVIDIA GPUs using CUDA and MPI

Dec 2015 - Jan 2016. **Intern: US Army Research Labs**, Computational Science Division  
May 2015 - Aug 2015. **Intern: US Army Research Labs**, Computational Science Division

- Accelerating software for real-time optimal control (summer) & using AR technology for info viz (winter)

Dec 2014 - Jan 2015. **Intern: US Army Research Labs**, Guidance Technology Branch  
May 2014 - Aug 2014. **Intern: US Army Research Labs**, Guidance Technology Branch

- Using OpenCV for real-time sensing (summer) & developing software for embedded systems (winter)

## Education

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

- *Thesis: Math. Softw. for Multiobjective Optimization Problems; Outstanding Dissertation Award nominee*

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

- *Summa cum laude; 2x ACM ICPC site champion; 8x Dean's list; 4x all-ODAC (conference) for varsity tennis*

## Awards

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2021. **Nominee for Outstanding Dissertation Award: Virginia Tech**, Graduate School  
2019. **Davenport Leadership Fellowship: Virginia Tech**, College of Engineering  
2018. **SCGSR Award: DOE Office of Science**, Graduate Student Research (SCGSR) Program  
2018. **Pratt Fellowship: Virginia Tech**, College of Engineering  
2017. **Pratt Fellowship: Virginia Tech**, College of Engineering  
2016. **Cunningham Doctoral Fellowship: Virginia Tech**, Graduate School  
2016. **Davenport Leadership Fellowship: Virginia Tech**, College of Engineering  
2016. **Outstanding Student in Computer Science & Mathematics: Virginia Wesleyan University**

## Publicly Available Software

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2022. **ParMOO**: Python library for parallel multiobjective simulation optimization. Release: 0.1.0  
Devs: **T. H. Chang** (lead), S. M. Wild, and H. Dickinson Primary Prog. Lang: Python 3  
git: <https://github.com/parmoo/parmoo>

2022. **VTMOP**: Solver for blackbox multiobjective optimization problems.  
Devs: **T. H. Chang** (sole) Primary Prog. Lang: Fortran 2008  
git: <https://github.com/vtopt/VTMOP>

2020. **DelaunaySparse**: Interpolation via a sparse subset of the Delaunay triangulation.  
Devs: **T. H. Chang** (lead) and T. C. H. Lux Primary Prog. Lang: Fortran 2003  
git: <https://github.com/vtopt/DelaunaySparse>

2019. **QAML**: Quantum annealing math library.  
Devs: T. C. H. Lux, **T. H. Chang**, and S. S. Tipirneni Primary Prog. Lang: Python 3  
git: <https://github.com/tchlux/qaml>

## Leadership Activities

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### Students Advised

Jun 2022 - Aug 2022. Manisha Garg (PhD student at UIUC), intern at Argonne via NSF MSGI program  
Jun 2022 - Aug 2022. Hyrum Dickinson (undergrad at UIUC), intern at Argonne via DOE SULI program

### Minisymposia Organized

- SIAM Conference on Optimization (2021)
- SIAM Conference on Computational Science and Engineering (2021)

### Institutional Service

Nov 2022 - Present. **Organizing Committee: FASTMath Institute Seminar Series**  
Nov 2022. **Technical Reviewer: Sustainable Research Pathways**  
Aug 2017 - May 2020. **Founding Member: Virginia Tech, Computer Science Graduate Counsel**  
Mar 2019. **Primary Student Organizer: Virginia Tech, Comp. Sci. Graduate Preview Weekend**