

Leila Ghaffari

Curriculum Vitae

August 2022

GitHub : [LeilaGhaffari](#)

Email : Leila.Ghaffari@colorado.edu

ORCID : <https://orcid.org/0000-0002-0965-214X>

LinkedIn : <https://www.linkedin.com/in/leila-ghaffari-2432a019a>

Google Scholar : <https://scholar.google.com/citations?user=gW-Ve9sAAAAJ>

EDUCATION

- **University of Colorado Boulder** Boulder, CO
PhD in Computer Science *Aug. 2019 – Present*
- **Sharif University of Technology** Tehran, Iran
M.Sc in Chemical Engineering *Sep. 2013 – Jan. 2016*
- **University of Tehran** Tehran, Iran
B.Sc in Chemical Engineering *Sep. 2006 – Jan. 2011*

EXPERIENCE

- **University of Colorado Boulder** Boulder, CO
Graduate Research Assistant *Apr. 2020 - Present*

Contributing to the development of [libCEED](#), a new open-source mathematical software library for High-Performance Scientific Computing under the supervision of [Jed Brown](#) within the Center for Efficient Exascale Discretizations ([CEED](#)) of the Exascale Computing Project ([ECP](#)).
- **The National Center for Atmospheric Research (NCAR)** Boulder, CO
SIParCS Intern *May 2021 - Jul. 2021*

Ported the Shallow Water Model mini-app with DPC++, ran it on an Intel Xeon Skylake CPU and an Intel-Xe GPU with different problem sizes, and studied the performance of the ported code ([Performance Portability of Shallow Water Model with DPC++](#)).
- **University of Colorado Boulder** Boulder, CO
Collaborating Researcher *Apr. 2019 - Apr. 2020*

Using [PETSc](#), expanded a Navier-Stokes solver mini-app for compressible gas dynamics in a three-dimensional geometry in libCEED in collaboration with [Kenneth Jansen](#).
- **Universite d'Avignon et des Pays du Vaucluse** Avignon, France
Intern *Jan. 2017 - Jun. 2017*

Developed environmental-friendly chemical processes.
- **Sharif University of Technology** Tehran, Iran
Graduate Research Assistant *Feb. 2014 - Jan. 2016*

Designed a bioreactor for Sulfate reducing processes and studied the experimental consistency of the observations with theory.
- **Tehran Oil Refinery Company** Tehran, Iran
Intern *Jun. 2009 - Sep. 2009*

Studied the Health, Safety and Environment (HSE) management of the Tehran Oil Refinery Company.

TECHNICAL SKILLS

- **Programming Languages:** C/C++, Python, R, MATLAB
- **Software and Tools:** Git, Make, Snakemake, Travis CI, Linux Bash, Valgrind, GNU Debugger, L^AT_EX, AutoCAD, SOLIDWORKS, ChemCAD, Aspen HYSYS
- **High-Performance Computing:** Intel Advisor, DPC++, MPI, MPI I/O, OpenMP, Slurm

PUBLICATIONS

- Jed Brown, Valeria Barra, Natalie Beams, **Leila Ghaffari**, Matthew Knepley, William Moses, Rezgar Shakeri, Karen Stengel, Jeremy L. Thompson, and Junchao Zhang. 2022. *Performance Portable Solid Mechanics via Matrix-Free p-Multigrid*. [doi:10.48550/arXiv.2204.01722](https://doi.org/10.48550/arXiv.2204.01722)
- Jed Brown, Ahmad Abdelfattah, Valeria Barra, Natalie Beams, Jean-Sylvain Camier, Veselin Dobrev, Yohann Dudouit, **Leila Ghaffari**, Tzanio Kolev, David Medina, Will Pazner, Thilina Rathnayake, Jeremy Thompson, Stan Tomov, *libCEED: Fast algebra for high-order element-based discretizations*, Journal of Open Source Software, 6(63), 2945, [doi:10.21105/joss.02945](https://doi.org/10.21105/joss.02945)
- Boublenza I, Lazouni HA, **Ghaffari L**, Ruiz K, Fabiano-Tixier AS, Chemat F, *Influence of roasting on sensory, antioxidant, aromas, and physicochemical properties of carob pod powder (Ceratonia siliqua L.)*, J Food Qual 2017:1-10. [doi:10.1155/2017/4193672](https://doi.org/10.1155/2017/4193672)

TECHNICAL REPORTS

- Kolev, Tzanio, Fischer, Paul, Abdelfattah, Ahmad, Beams, Natalie, Brown, Jed, Camier, Jean-Sylvain, Carson, Robert, Chalmers, Noel, Dobrev, Veselin, Dudouit, Yohann, **Ghaffari, Leila**, Joshi, Aditya Y., Kerkemeier, Stefan, Lan, Yu-Hsiang, McDougall, Damon, Medina, David, Min, Misun, Mishra, Abhishek, Pazner, Will, ... Warburton, Tim. (2022). *CEED ECP Milestone Report: High-order algorithmic developments and optimizations for more robust exascale applications*. Zenodo. [doi:10.5281/zenodo.6514857](https://doi.org/10.5281/zenodo.6514857)
- Kolev, Tzanio, Fischer, Paul, Austin, Anthony P., Barker, Andrew T., Beams, Natalie, Brown, Jed, Camier, Jean-Sylvain, Chalmers, Noel, Dobrev, Veselin, Dudouit, Yohann, **Ghaffari, Leila**, Kerkemeier, Stefan, Lan, Yu-Hsiang, Merzari, Elia, Min, Misun, Pazner, Will, Ratnayaka, Thilina, Shephard, Mark S., Siboni, Morteza H., Warburton, Tim. (2021). *CEED ECP Milestone Report: High-order algorithmic developments and optimizations for large-scale GPU-accelerated simulations*. Zenodo. [doi:10.5281/zenodo.4672664](https://doi.org/10.5281/zenodo.4672664)
- Abdelfattah A., Barra V., Beams N., Brown J., Camier J. S., Dobrev V., Dudouit Y., **Ghaffari L.**, Kolev T., Medina D., Rathnayake T., Thompson J. L., Tomov S., *libCEED User Manual*, Version 0.7, Zenodo, September 2020. [doi:10.5281/zenodo.4302737](https://doi.org/10.5281/zenodo.4302737)

INVITED TALKS

- **World and Asian Pacific Congresses on Computational Mechanics** Yokohama-Online
WCCM-APCOM 2022 Jul. 2022
On Performance portability of physical problems using libCEED
Leila Ghaffari, Valeria Barra, Jeremy Thompson, James Wright, and Jed Brown
- **SIAM Conference on Parallel Processing for Scientific Computing** Online
PP22 Feb. 2022
On Portability and Performance Versatility in Nonlinear Solid and Fluid Mechanics Using libCEED and PETSc
Leila Ghaffari, Jeremy Thompson, Valeria Barra, Rezgar Shakeri, Karen Stengel, and Jed Brown

- **SIParCS 2021** Online
The National Center for Atmospheric Research (NCAR) *Jul. 2021*
Performance Portability of Shallow Water Model with DPC++
Leila Ghanffari and Zephaniah Connell
- **SIAM Conference on Computational Science and Engineering** Online
CSE21 *Mar. 2021*
Advances in LibCEED with Applications to Fluid and Solid Mechanics
Leila Ghaffari, Jeremy Thompson, Valeria Barra, and Jed Brown

CONTRIBUTED TALKS

- **European Seminar on Computing** Pilsen, Czech Republic
ESCO 2020 *Jun. 2020*
Towards Exascale Computing: Vectorized Operator Evaluations on Heterogeneous Architectures with libCEED
Valeria Barra, Jeremy Thompson, **Leila Ghaffari**, Yohann Dudouit, and Jed Brown

POSTERS

- **SIParCS 2021** Online
The National Center for Atmospheric Research (NCAR) *Jul. 2021*
Performance Portability of Shallow Water Model with DPC++
Leila Ghanffari and Zephaniah Connell
- **Exascale Computing Project Annual Meeting** Online
2021 ECP Annual Meeting *Apr. 2021*
LibCEED 0.8: Concepts and mini-apps
Valeria Barra, Natalie Beams, Jed Brown, Yohann Dudouit, **Leila Ghaffari**, Arash Mehraban, Will Pazner, Rezgar Shakeri, and Jeremy Thompson
- **SIAM Conference on Computational Science and Engineering** Online
CSE21 *Mar. 2021*
LibCEED – The Finite Elements Library without Elements
Valeria Barra, Jeremy Thompson, **Leila Ghaffari**, and Jed Brown
- **AGU Fall Meeting** Online
AGU2020 *Dec. 2020*
Efficient implementations for matrix-free solutions of PDEs with libCEED
Valeria Barra, Jed Brown, Jeremy Thompson, **Leila Ghaffari**, Yohann Dudouit, and Natalie Beams
- **Women in High Performance Computing Summit** Vancouver, Canada
WHPC *Apr. 2020*
An open-source library for high-performance computing on heterogeneous architectures: libCEED
Valeria Barra, Jed Brown, Yohann Dudouit, **Leila Ghaffari**, and Jeremy Thompson

HONORS AND AWARDS

- **Clive Baillie Memorial Fellowship (\$1000)** Boulder, CO
Computer Science Department at CU Boulder *Oct. 2020*
Awarded from the Department of Computer Science at CU Boulder to attend the 2021 SIAM Conference on Computational Science and Engineering (CSE2021).

TEACHING EXPERIENCE

- **University of Tehran** Tehran, Iran
Process Design with HYSYS *Jan. 2011 - May 2011*

Teaching assistant for **Computer Aided Process Design and Simulation with Aspen HYSYS**, a chemical process simulator used to mathematically model chemical processes, at the Chemical Engineering Department.

MENTORING EXPERIENCE

- **Summer Program for Undergraduate Research (SPUR)** Boulder, CO
University of Colorado Boulder *May 2022 - Aug. 2022*

Kellen Davis Martin (B. Sc. in Aerospace Engineering, University of Colorado Boulder)

- **Summer Program for Undergraduate Research (SPUR)** Boulder, CO
University of Colorado Boulder *Jun. 2021 - Aug. 2021*

David Reeder (B. Sc. in Mechanical Engineering, University of Colorado Boulder)