@henryleberre   **Henry A. Le Berre [U.S. & French Citizen]**   henryleberre@gmail.com

WORK EXPERIENCE

SpaceX – Space Exploration Technologies Corp.

- **Software Propulsion Engineer I**   **January 2025 – Present**
  Raptor Combustion Devices Engineering | Raptor Production Group   Los Angeles, CA, USA [Onsite]
- **Software Engineering Intern**   **August – December 2023**
  Raptor Combustion Devices Engineering | Raptor Production Group   Los Angeles, CA, USA [Onsite]

> **25% speed up** of the **Raptor Combustion CFD Code** on production simulations through C++ CUDA GPU kernel optimizations

Verkada Inc.

- **Software Engineering Intern**   **May – August 2023**
  Device Platform Team | Alarms and Intrusion   San Mateo, CA, USA [Onsite]

> **Verkadathon** (Verkada Hackathon) **Winner** for "Best Use of Verkada Products" with Viraj Ramakrishnan and Jay Chou

Computational Physics Group @ Georgia Tech.

- **Student Assistant**   **Summer 2022/2024**
  School of Computational Science and Engineering   Atlanta, GA, USA [Remote]

PUBLICATIONS & PAPERS

- **Pyrometheus: Symbolic abstractions for XPU and automatically differentiated computation of of combustion kinetics and thermodynamics**   **April 2025**
  10.48550/arXiv.2503.24286
- **MFC 5.0: An exascale many-physics flow solver**   **March 2025**
  Preprint: Computer Physics Communications   10.48550/arXiv.2503.07953
- **Undergraduate Thesis: Open-Source Combusting Flow Simulation**   **December 2024**
  Georgia Institute of Technology, Computer Science   github:henryleberre/thesis
- **Method for scalable and performant GPU-accelerated simulation of multiphase compressible flow**   **May 2024**
  Computer Physics Communications   10.1016/j.cpc.2024.109238
- **Application Experiences on a GPU-Accelerated Arm-based HPC Testbed**   **September 2022**
  HPC Asia '23. International Workshop on Arm-based HPC: Practice and Experience (IWAHPCE)   10.1145/3581576.3581621

ACADEMIC RESEARCH AFFILIATIONS

Computational Physics Group (CPG) at Georgia Tech | Multi-Component Flow Code (MFC)   **November 2021 – December 2024**

- Implemented reactive flow modeling (combustion), boundary condition patches, and many other features.
- Offloaded & Optimized the Fortran/MPI flow solver using OpenACC on leadership-class HPC systems of GPUs (OLCF Frontier & Summit).
- Modernized the codebase, adding a test suite, CI, CMake, and a custom build toolchain for case-specific compile-time optimizations.

Space Systems Design Lab (SSDL) at Georgia Tech | GT-II Satellite   **November 2021 – December 2022**

Designed & implemented the GT-II satellite's Over-The-Air update (OTA) protocols, on bare-metal, from ground systems to in-orbit handling.

EDUCATION

- **Georgia Institute of Technology** | Bachelor's in Science in **Computer Science (GPA: 3.82 "High Honor")**   **Summer 2021 – Fall 2024**
  Concentrations: **Modeling & Simulation** and **Systems & Architecture** with the **Research Option**   Atlanta, GA, USA
  Awards: **President's Undergraduate Research Award** (PURA) **Travel**, **Faculty Honors**, **Dean's List**, **HOPE Scholarship**
- **Lycée Lavoisier** | **Baccalauréat Général** with **High Honors** (« mention très bien »)   **July 2021**
  Concentrations: **Mathematics**, **Physics**, **Computer Science**   Paris V, France

LEADERSHIP, SERVICE, AND MISCELLANEOUS

- **Student Volunteer** at **Supercomputing 2024** | Atlanta, GA, USA [Onsite]   **November 17-22, 2024**
- **Student Volunteer** at **Supercomputing 2023** | Denver, CO, USA [Onsite]   **November 11-17, 2023**
- **Co-Chair** of the **Georgia Tech French Club**   **Fall 2022 – Fall 2024**
- **Languages: English (Native, U.S. Citizen) and French (Native, French Citizen)**

TALKS, POSTERS, AND PRESENTATIONS

- **OpenACC offloading of the MFC compressible multiphase flow solver on AMD and NVIDIA GPUs**   **November 18, 2024**
  Supercomputing 2024 (SC'24), Atlanta, Georgia, USA   Listing | Paper
- **Compressible multi-species flow simulation on OLCF Frontier via OpenACC**   **March 7, 2024**
  American Physical Society (March 2024), Minneapolis, Minnesota, USA   Abstract

- **Fast simulation of multiphase compressible flows through GPU acceleration**   **April 5, 2023**
- **A stochastic computational method for bubbly flows with first steps towards representing inception**   **April 5, 2023**
  11th International Conference on Multiphase Flow (ICMF). Kobe, Japan   [Program](#)
- **Compressible multiphase flow simulation at near-exascale via a scalable GPU implementation**   **March 7, 2023**
  American Physical Society (March 2023), Las Vegas, Nevada, USA   [Abstract](#)
- **Towards exascale multiphase compressible flow simulation via scalable interface capturing-based solvers…**   **November 21, 2022**
  American Physical Society (November 2022), Indianapolis, Indiana, USA   [Abstract](#)
- **Scalable GPU Accelerated Simulation of Multiphase Compressible Flow**   **November 15, 2022**
  Supercomputing 2022 (SC'22), Dallas, Texas, USA   [Poster](#) | [Paper](#)
- **Exascale for humans: A development environment for MFC**   **February 19, 2022**
  Georgia Scientific Computing Symposium 2022 (GSCS 2022), Atlanta, Georgia, USA   [Website](#)