

# Dragos B. Chirila




## Computational Physicist

-  [cdragos@awi.de](mailto:cdragos@awi.de)
-  <https://gelb-lang.org>
-  April 19th, 1984
-  Str. Amurgului Nr. 4, 700415, Iasi, Romania
-  +40 728 33 9424
-  Romanian, German













## Network

-  [LinkedIn Profile](#)
-  [Github Projects](#)
-  [Gitlab Projects](#)


## Languages

-  Romanian ● ● ● ● ●
-  English ● ● ● ● ●
-  German ● ● ● ● ●

## Hard Skills

-  Linux
-  Programming languages / libraries
  -  Python ● ● ● ● ●
  -  C++ ● ● ● ● ●
  -  Fortran ● ● ● ● ●
  -  OpenCL, CUDA, C ● ● ● ● ●
  -  Antlr4, LLVM ● ● ● ● ●
  -  MPI, OpenMP ● ● ● ● ●
  -  HTML, CSS, JS ● ● ● ● ●
  -  NetCDF, SQLite ● ● ● ● ●
-  Algorithms – Test-driven development (TDD) – Refactoring – Various build-systems – Git
-  Physics, Mathematical Modeling

## Soft Skills

-  Self-directed – Fast learner – Communicates easily – Passionate about technology – Research and teaching experience

## Working Experience

- 2020 – present **Research Collaborator** Alfred-Wegener Institute (AWI) Bremerhaven  
Preparing the open-source release of the GeLB domain-specific programming language (developed during PhD). Tasks include improving compiler error-messages and the documentation, improving the backend code-generation, and adding language support in several editors and IDEs.
- 2020 **Researcher** AWI Bremerhaven  
Worked on improving the architecture of the GeLB compiler. Tasks included re-design of the intermediate representation (abstract syntax tree) of the compiler, development of a test-suite, and fine-tuning the language syntax, based on feedback from potential users.
- 2019 – 2020 **Research Collaborator** terrafuse.ai, Lawrence Berkeley National Laboratory (LBNL)  
Collaborated on a project focused on simulating physical phenomena using novel machine learning algorithms (generative adversarial networks). My main contributions were to create GPU-accelerated simulations which produced a large part of the training data, and to add the physical interpretation of the simulation results, for validating the machine learning models.
- 2015 – 2019 **Scientific Programmer, Post-doctoral researcher** AWI Bremerhaven  
Worked on porting components of Earth System Models (ESMs) to novel compute architectures (such as GPUs and FPGAs), using OpenCL. The main outcome of the project was the creation of a new C software library, which facilitates the process of porting high-performance applications to new hardware architectures.
- 2009 – 2013 **Scientific Programmer, PhD student** AWI Bremerhaven  
Implemented and tested computational fluid dynamics (CFD) solvers and data-analysis pipelines, using various technologies.
- 2006 – 2009 **Student Assistant** Max Planck Institute (MPI) Bremen, AWI  
Worked on software optimization for the memory hierarchy. Other tasks included writing utilities for geometry-generation and post-processing of simulation results, calculations of analytic solutions for low Reynolds number flows through porous media, and teaching.
- 2010 – 2018 **Ph.D. (Physics)** University of Bremen, AWI Bremerhaven  
The thesis (*"Towards lattice Boltzmann models for climate sciences. The GeLB programming language with applications"*) focused on development of a new model-framework (GeLB), which facilitates experimentation and inter-comparison of LBM algorithms. Tasks related to the project included:
  - design of a new domain-specific language (DSL), which allows specification (in a concise form) of the LBM computational kernels (core evolution-rules and boundary-conditions)
  - implementation (using Python) of a source-to-source compiler (starting from code written in the new GeLB DSL)
  - application of the framework to simulate convection and the barotropic wind-driven circulation of the oceans
- 2007 – 2009 **Master (Environmental Physics)** University of Bremen, AWI Bremerhaven
- 2004 – 2007 **Bachelor (Physics)** Jacobs University Bremen

## Selected Publications

- 2021      **GeLB: A new domain-specific programming language for lattice Boltzmann modeling**  
*Dragos B. Chirila, Gerrit Lohmann*  
Journal of Computational Physics (*manuscript in preparation*)
- 2020      **Enforcing statistical constraints in generative adversarial networks for modeling chaotic dynamical systems**  
*Jin-Long Wu, Karthik Kashinath, Adrian Albert, Dragos B. Chirila, Heng Xiao*  
Journal of Computational Physics (published)
- 2018      **Towards Lattice Boltzmann Models for Climate Sciences**  
*Dragos B. Chirila*  
University of Bremen (published, PhD thesis)
- 2015      **Introduction to Modern Fortran for the Earth System Sciences**  
*Dragos B. Chirila, Gerrit Lohmann*  
Springer (published)
- 2010      **Climate model bias correction und die deutsche Anpassungsstrategie**  
*Manfred Mudelsee, Dragos B. Chirila, Th Deuschländer, C Döring, J Haerter, S Hagemann, H Hoffmann, D Jacob, P Krahe, Gerrit Lohmann, Chr Moseley, E Nilson, O Panferov, Th Rath, B Tinz*  
Mitteilungen Deutsche Meteorologische Gesellschaft (published)

## References

- **Prof. Dr. Gerrit Lohmann**
  - **Affiliation:** AWI Bremerhaven (Climate Sciences – Paleo-climate Dynamics)
  - **Email:** [gerrit.lohmann@awi.de](mailto:gerrit.lohmann@awi.de)
  - **Telephone:** +49 471 4831 1561
- **Prof. Dr. Vadym Aizinger**
  - **Affiliation:** University of Bayreuth (Faculty of mathematics, physics and computer science)
  - **Email:** [vadym.azinger@uni-bayreuth.de](mailto:vadym.azinger@uni-bayreuth.de)
  - **Telephone:** +49 921 55 7873
- **Prof. Dr. Sergey Danilov** (Climate Sciences – AWI Bremerhaven)
  - **Affiliation:** AWI Bremerhaven (Climate Sciences – Climate Dynamics), Jacobs University Bremen
  - **Email:** [sergey.danilov@awi.de](mailto:sergey.danilov@awi.de)
  - **Telephone:** +49 471 4831 1764