EDOARDO CIPRIANO 💿

Department of Chemistry, Materials And Chemical Engineering "G. Natta"

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PhD Student & Politecnico di Milano

I am a Chemical Engineer with a strong passion for computer programming and Computational Fluid Dynamics. I am about to complete a PhD about the numerical modeling of droplet evaporation and combustion, with the aim to provide insight into the mechanisms that lead to the formation of pollutants, and to advance the numerical modeling technique that allow to simulate fuel droplets.

EDUCATION

Politecnico di Milano November 2020 - Present PhD in Industrial Chemistry and Chemical Engineering Project: "Direct Numerical Simulations of Droplet Evaporation and Combustion in a Geometric Volume-Of-Fluid Framework" Supervisor: Prof. Alberto Cuoci

Ordine degli Ingegneri di Milano

Entry exam for registration with order of professional industrial engineers (Section A) Grade: 87/100

Politecnico di Milano

M. S. in Chemical Engineering

Thesis Work: "Reactive Multisphere Modelling Approach for the Simulation of Non-Spherical Moving Particles in Catalytic Systems" Supervisor: Prof. Matteo Maestri Grade: 110/110 Language: English

Politecnico di Milano

B. S. in Chemical Engineering
Thesis Work: "Validation of Detailed Kinetics for the Combustion of Small Hydrocarbons"
Supervisor: Prof. Tiziano Faravelli
Grade: 92/110
Language: Italian

Istituto Tecnico Industriale Statale P. Hensemberger

High School Diploma

EXPERIENCE

Tutoring Activity

Computational Fluid Dynamics of Reactive Flows Prof. Alberto Cuoci Finite Difference and Finite Volume discretization, Projection Method, techniques for the solution of species equations with chemical reactions, MATLAB implementation of CFD algorithms.

Thesis Supervision

Supervision of Master's Thesis Work C. Canciani: "Multiphase CFD model for the simulation of multicomponent evaporating droplets with liquid-phase kinetics"

Teaching Assistant Chemical Plants Prof. Alessandro Stagni October 2021

October 2018 - October 2020

September 2015 - October 2018

September 2010 - June 2015

November 2021 - January 2022

November 2020 - April 2022

February 2022 - July 2022

Shortcut sizing of the main unit operations of chemical engineering, with particular emphasis on the separation processes: flash separation, distillation, absorption/stripping, solvent extraction, adsorption.

Teaching Assistant

Advanced Transport Phenomena Prof. Alberto Cuoci Finite Difference and Finite Volume discretization, Projection Method, techniques for the solution of species equations with chemical reactions, MATLAB implementation of CFD algorithms. Numerical modeling of turbulence, radiation, multiphase flows. Introduction to population balance equations.

EXPERIENCE ABROAD

PhD Period Abroad at Sorbonne University

Visiting PhD at Institut D'Alembert, Sorbonne University, Paris (France).

AWARD, SCHOLARSHIPS

PhD Scholarship

Italian Ministry of Education (MIUR)

March 2023 - July 2023

September 2022 - February 2024

November 2020

PEER-REVIEWED PUBLICATIONS

E. Cipriano, A.E. Saufi, A. Frassoldati, T. Faravelli, S. Popinet, A. Cuoci. Multicomponent droplet evaporation in a geometric volume-of-fluid framework. Journal of Computational Physics, 2024, 507, pp.112955

E. Cipriano, A. Frassoldati, T. Faravelli, S. Popinet, A. Cuoci. A low-Mach volume-of-fluid model for the evaporation of suspended droplets in buoyancy-driven flows. International Journal of Heat and Mass Transfer, 2024, 234, pp.126115

A. Nobili, N. Fanari, T. Dinelli, E. Cipriano, A. Cuoci, M. Pelucchi, A. Frassoldati, T. Faravelli. Kinetic modeling of carbonaceous particle morphology, polydispersity and nanostructure through the discrete sectional approach. Combustion and Flame, 2024, 269, pp.113697

A. Cuoci, E. Cipriano, A.E. Saufi, A. Frassoldati, A numerical framework for modeling evaporation and combustion of isolated, spherically-symmetric, multi-component fuel droplets. Journal of Computational Science, 2024, 83, pp. 102453

CONFERENCES, SUMMER SCHOOLS

Participation to International Conference

43rd Meeting of the Italian Section of the Combustion Institute, Ischia (Italy)

Oral presentation of research work in progress: E. Cipriano, A. E. Saufi, A. Cuoci, A. Frassoldati, T. Faravelli, R. Calabria, P. Massoli: "Reactive Volume of Fluid Model for the Simulation of the Evaporation and Combustion of FPBO Surrogate Components".

Participation to International Summer School July 2021

Simulations of Molecular Systems for Chemistry, Materials and Biology, Lecco (Italy)

Participation to International Conference

18th International Conference on Numerical Combustion, San Diego (California)

Oral presentation of research work in progress: E. Cipriano, A. E. Saufi, T. Faravelli, A. Cuoci: "A Coupled-Interface Strategy for VOF Simulations of Non-Spherical Evaporating Droplets".

Participation to International Conference

4th International Conference on Numerical Methods in Multiphase Flows (Venice)

Oral presentation of research work in progress: E. Cipriano, A. Frassoldati, T. Faravelli, A. Cuoci: "Multicomponent Droplet Evaporation in a Geometric Volume of Fluid Framework".

October 2021

May 2022

September 2022

June 2023

15th International Conference on Combustion Technologies for a Clean Environment (Lisbon) Oral presentation of research work in progress: E. Cipriano, A. Frassoldati, A. Cuoci, T. Faravelli: "Numerical Model for the Evaporation and Combustion of Fuel Droplets Using a Geometric Volume-Of-Fluid Approach".

Participation to International Conference

Participation to International Conference

BGUM 2023 – Basilisk (Gerris) Users' Meeting (Paris)

Oral presentation of research work in progress: E. Cipriano: "Modelling Evaporation and Combustion of Fuel Droplets Using Basilisk".

Participation to International Conference

19th International Conference on Numerical Combustion (Kyoto)

Oral presentation of research work in progress: E. Cipriano, A. Cuoci: "Combustion of Suspended Droplets in Normal Gravity Conditions".

Participation to International Conference

5th International Conference on Numerical Methods in Multiphase Flows (Reykjavík)

Oral presentation of research work in progress: E. Cipriano, S. Popinet, A. Cuoci: "Evaporation of Suspended Droplets in Normal Gravity Conditions".

Participation to International Conference

CI's 40th International Symposium - Emphasizing Energy Transition (Milan)

Poster presentation: E. Cipriano, A. Frassoldati, T. Faravelli, A. Cuoci: "Direct numerical simulations of deformable droplet combustion in buoyancy-driven flows".

LANGUAGES

	Reading	Writing	Speaking
Italian	Mother Tongue	Mother Tongue	Mother Tongue
English	Excellent	Excellent	Excellent

TECHNICAL SKILLS

Computer Languages	Advanced C and C++ programming skills Knowledge of Object-Oriented Programming Basic Python skills Experience with MATLAB for chemical engineering
CFD Tools	Experience with OpenFOAM libraries and solvers Experience with the Basilisk code
Operative Systems	Linux environment and bash command line
Other Tools	git, Latex, Microsoft Office

PERSONAL PAGES AND CODE REPOSITORIES

Github https://github.com/edocipriano **Basilisk** http://basilisk.fr/sandbox/ecipriano/README June 2024

May 2024

June 2023

July 2024