

OLIVIER DESJARDINS

Professional Address

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EDUCATION

- 2004 – 2008 **Ph.D. in Mechanical Engineering**, Flow Physics and Computational Engineering, **Stanford University**, California.
- 2002 – 2003 **Master of Science in Mechanical Engineering**, Flow Physics and Computational Engineering, **Stanford University**, California.
Major in fluid mechanics.
- 2000 – 2003 **Master of Science in Aeronautics and Astronautics, SUPAERO** (French Engineering School for Aeronautics and Space), Toulouse, France.
Major in fluid mechanics, energy and propulsion systems.
- 1998 – 2000 Classes Préparatoires aux Grandes Écoles (intensive preparatory classes for French engineering schools admission tests).
Major: Physics and chemistry.

DISSERTATION

“Numerical methods for liquid atomization and application in detailed simulations of a Diesel jet.”

Development of high order methods for robust and accurate simulation of turbulence. Development of novel numerical methods for accurate and conservative phase interface tracking. Numerical study of turbulent atomization of Diesel-type jets and air-assisted liquid atomization.

Ph.D. Advisor: Heinz Pitsch.

Reading Committee: Gianluca Iaccarino, Sanjiva K. Lele.

RESEARCH EXPERIENCE

- 2008 – present **Assistant Professor** in Mechanical Engineering, **University of Colorado at Boulder**, Colorado.
- 06 – 08/2008 **Post-doctoral Scholar** in Computational Energy Sciences group led by Prof. H. Pitsch, Mechanical Engineering, **Stanford University**, California.
- 2003 – 2008 **Research Assistant** in Computational Energy Sciences group led by Prof. H. Pitsch, Mechanical Engineering, **Stanford University**, California.
Development of a parallel code for DNS and LES of complex reacting multiphase turbulent flows with arbitrarily high accuracy.
Development of accurate and conservative interface tracking methods.
Development of Eulerian and Lagrangian methods for spray simulations.
Numerical investigation of liquid Diesel jet atomization and air-assisted liquid atomization.
DNS and LES of reacting turbulent multiphase flows.
- 2003 – 2004 **Administrator** of a 166-processor Beowulf/Myrinet cluster.
Responsible for hardware and software installation and maintenance.

- 2000 – 2002 **Research projects** at **SUPAERO**, Toulouse, France.
Micro-propeller optimization – PIV measurements (3 months).
Wind tunnel study of Wing-In-Ground effect applied to Ekranoplanes (2 months).
- 2001 **Summer internship** at Tecumseh (TPCo) Europe, La Verpillière, France.
Development of database management and visualization software in collaboration with TPCo Research Laboratory, Ann Harbor, MI.
- Reviewer for ***Journal of Fluid Mechanics, Journal of Computational Physics, and International Journal of Heat and Fluid.***

TEACHING EXPERIENCE

- Fall 2008 **Instructor** for **Graduate Fluid Mechanics**, Mechanical Engineering and Aerospace Engineering, University of Colorado at Boulder
- 2007 – 2008 **Mentoring** two “Independent Studies” students, Stanford University
Topics: Overset grid methods for incompressible flows
Automatic generation of turbulent inflow conditions
- 09/06 – 12/06 **Teaching assistant** for graduate course “Multiphase Flow Modeling”, Stanford University
- 01/05 – 03/05 **Teaching assistant** for graduate course “Fluid Mechanics – Laminar viscous fluid flow”, Stanford University
- 2000 – 2002 **Mentoring** undergraduate students at the Computer Science laboratory, SUPAERO

SELECTED PUBLICATIONS

- ❖ DESJARDINS, O., PITSCH, H. (2008), Detailed numerical investigation of turbulent atomization of liquid jets, manuscript in preparation for submission to J. Fluid Mech.
- ❖ DESJARDINS, O., PITSCH, H. (2009) A spectrally refined interface approach for simulating multiphase flows, J. Comp. Physics, 228 (5), 1658–1677.
- ❖ PITSCH, H., DESJARDINS, O., BALARAC, G., IHME, M. (2008) Large-eddy simulation of turbulent reacting flows, Prog. Aerospace Sci., 44 (6), 466–478.
- ❖ DESJARDINS, O., MOUREAU, V., PITSCH, H. (2008) An accurate conservative level set/ghost fluid method for simulating turbulent atomization, J. Comp. Physics, 227 (18), 8395–8416.
- ❖ DESJARDINS, O., BLANQUART, G., BALARAC, G., PITSCH, H. (2008) High order conservative finite difference scheme for variable density low Mach number turbulent flows, J. Comp. Physics, 227 (15), 7125–7159.
- ❖ DESJARDINS, O., FOX, R. O., VILLEDIEU, P. (2008) A quadrature-based moment method for dilute fluid-particles flows, J. Comp. Physics, vol. 227, issue 4, pp. 2514–2539.
- ❖ ABARZHI, S. I., DESJARDINS, O., NEPOMNYASHCHY, A., PITSCH, H. (2007) Influence of parametric forcing on the nonequilibrium dynamics of wave patterns, Phys. Rev. E 75, 046208.
- ❖ DESJARDINS, O., FOX, R. O., VILLEDIEU, P. (2006) A quadrature-based moment closure for the Williams spray equation, *Proceedings of the CTR Summer Program*, pp. 223–234, Center for Turbulence Research, NASA Ames/Stanford Univ.
- ❖ KIM, D., DESJARDINS, O., HERRMANN, M., MOIN, P. (2006) Toward two-phase simulation of the primary breakup of a round liquid jet by a coaxial flow of gas, *Annual Research Briefs*, pp. 185–195. Center for Turbulence Research, NASA Ames/Stanford Univ.

- ❖ KUROSE, R., DESJARDINS, O., NAKAMURA, M., AKAMATSU, F., PITSCH, H. (2004) Numerical simulations of spray flames, *Annual Research Briefs*, pp. 269—280, Center for Turbulence Research, NASA Ames/Stanford Univ.
- ❖ ABARZHI, S. I., DESJARDINS, O., PITSCH, H. (2003) The effect of surface topology on the nonlinear dynamics of Rossby waves, *Annual Research Briefs*, pp. 91—100, Center for Turbulence Research, NASA Ames/Stanford Univ.

SELECTED PROCEEDINGS AND PRESENTATIONS

- ❖ DESJARDINS, O., PITSCH, H. (2007) An accurate conservative level set/ghost fluid method for the simulation of turbulent primary atomization, American Physical Society DFD Fall meeting, Salt Lake City, UT.
- ❖ DESJARDINS, O., BLANQUART, G., BALARAC, G., PITSCH, H. (2007) High order conservative finite difference scheme for variable density low Mach number turbulent flows, American Physical Society DFD Fall meeting, Salt Lake City, UT.
- ❖ DESJARDINS, O., MOUREAU, V., KNUDSEN, E., HERRMANN, M., PITSCH, H. (2007) Conservative level set/ghost fluid method for simulating primary atomization, ILASS Americas 20th Annual Conference on Liquid Atomization and Spray Systems, Chicago, IL.
- ❖ DESJARDINS, O., MOUREAU, V., KNUDSEN, E., HERRMANN, M., PITSCH, H. (2006) Numerical simulation of the primary atomization of a coaxial liquid jet using a conservative level set/ghost fluid method, American Physical Society DFD Fall meeting, Tampa, FL.
- ❖ DESJARDINS, O., PITSCH, H. (2006) Modeling effect of spray evaporation on turbulent combustion, 10th International Congress on Liquid Atomization and Spray Systems, Kyoto, Japan.
- ❖ DESJARDINS, O., RAMAN, V., PITSCH, H. (2004) Sub-filter modeling for large eddy simulation of particle-laden flows, American Physical Society DFD Fall meeting, Seattle, WA.